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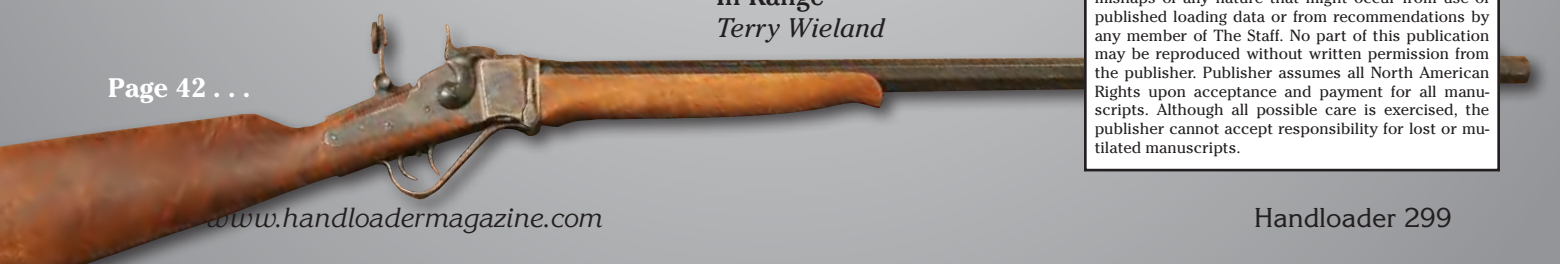
On the cover . . . An 1860's vintage Cape gun for .577 Snider and 20 gauge by Jos. Braddell & Son, Belfast. Photo by Terry Wieland.

COLUMNS



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George Weber

RELOADER'S PRESS by Dave Scovill

George Weber began work at Hodgdon Powder Company in the fall of 1991 and retired in 2005. George was an outstanding lab technician, as well as a competent gunsmith. Prior to Hodgdon, George had worked for me at PMC/Eldorado Cartridge during the years 1989-1991. When I moved to Hodgdon Powder Company, I hired him away from Eldorado. Early on, followng his session in the U.S. Marine Corps, George graduated from Gunsmith School in Trinidad, Colorado, and went on to other activities before getting firmly entrenched in the shooting industry. George was well known throughout the industry, was very knowledgeable in his field and was an avid hunter and competitive shooter. He loved black powder silhouette – and all silhouette shooting for that matter.

In his retirement years, George continued to shoot, hunt and enjoy the great outdoors. One of his favorite activities, next to "eating well," as he put it, was hunting and shooting ground squirrels. An intelligent and colorful character, George will be greatly missed by all of us who knew him.

(July 3, 1942 – July 27, 2015)

– Ron Reiber
Product Manager,
Hodgdon Powder Company

Cherry Picking

During my 25 years at the helm of *Handloader* magazine, we have made a conscious effort to balance the content with the wide variety of interest readers might have – from novice to expert, including full-time subscribers and occasional readers who, as I have alluded to previously in this column, apparently pick up the magazine off the rack at the local grocery store to bide time while their wife or whoever does the shopping. If something of interest shows up, they may purchase that copy or put it back in the stand – like my mentor and founder of the French Creek ranch did when he read the Sunday edition of the local newspaper from the rack in front of the grocery store, before the store opened, and then folded it neatly and put it back in the rack.

Nowadays, it is not unusual for occasional readers to pick up a copy of the magazine and nitpick it, complaining that we should have included more detail about this or that. In one instance, around issue No. 200 or thereabouts a few years ago, a critic seemed to think it was the inaugural (first) issue and should have included the .30-06, .270 Winchester, .45 ACP or other more popular calibers to attract readers, all in ignorance of the issue number on the cover and that the magazine had been on the newsstands across the country for at least 15 years. None of that, however, stopped this would-be reader from giving me a good chewing out for being so stupid.

More recently a "drive-by" critic found *Handloader* on the newsstand somewhere and, as a member of the Cast Bullet Association (CBA), briefly reviewed the cast bullet articles by Mike Venturino and John Haviland and went bal-

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listic. John had sized .45 ACP cast bullets to .451 inch and our would-be reader insisted that "everybody knows" they should be sized to .452 inch. Mike was hammered for using Linotype alloy in his article. Of course, our one-time reader was not aware of why Mike used that alloy; someone had given him what might amount to a life-time supply, which he stated in a previous column.

Then Mike, John and I were attacked for not being members of the CBA, or we would have known better than to commit such errors. The reader did not ask if we were members or ever had been; he just assumed we weren't. All this is interesting, especially since Wolfe Publishing has been a leader in publishing cast bullet one-time annuals, articles, columns and, more recently, videos, for over 40 years, which is not to ignore all the influence our staff writers have had on cast bullet designs over the years.

All the above is also interesting because a number of cast bullet experts, who use them regularly, often suggest *not* sizing cast bullets at all, unless they drop from the mould too large in diameter to allow chambering in the cartridge of interest. The late Al Miller was one of those, and I tend to agree; wherever possible, just use a sizing die that is as-cast diameter to lube the bullets. Of course, readers of this column are likely aware that my .45 Colt cast bullets are routinely sized to .4535 inch. So while our critic states that everybody knows cast bullets should be sized to .001 inch over groove diameter, he's apparently not as well informed as he might suggest. And just in case any would-be bullet casters might think all the equipment required for cast bullets isn't justified, in my early days before acquiring a sizing kit, I didn't size any cast bullets, and most loads shot quite well when the bullet alloy was appropriate for the loads used. Like most novices, who also read *Handloader* nowadays, I was happy as a clam. Ignorant maybe, but pleased with the results.

All this makes me wonder if folks often recommend some idea because they have never tried anything else. It is also my opinion that most folks who enthusiastically take exception to whatever product or process, have probably never tried it. That is, who would bother to try something if he/she thought it was stupid in the first place? Ergo, they have no personal experience to justify their condemnation.

For over 20 years now, good friend Don (Doc) Thomas, with whom I used to shoot when we both lived in Klamath Falls, Oregon, has mailed copies of groups he has fired with unmatched brass of different brands with a variety of calibers, mostly .45 ACP. Most of the groups he has forwarded are essentially the result of five or more shots in one .50- to .60-caliber hole.

Of course, everybody "knows" that unmatched brass will not shoot small groups, whether cast or jacketed bullets are used. Then I received another notice recently from a well-known shooter who came to the same result using mismatched brass.

The problem here is separating the myth associated with mismatched brass from the truth. But, as I have stated now and then over the years, it's quite possible that no one has seriously considered that mismatched brass might shoot as well as matched brass, and never tried it, at least more than once. Currently, it would be like committing vocational suicide for a writer to state that mismatched brass in rifles or handguns might produce acceptable groups, let alone excellent accuracy.

There are a lot of those myths floating around that no one will seriously challenge, largely because, like in the movie *The Man Who Shot Liberty Valance*, when the legend becomes the truth, print the legend. It reminds me of the article John Haviland wrote comparing match prepared brass with unprepared brass. When accuracy was essentially the same for both sets of loads, a reader wrote to condemn the Ruger M77 rifle John used – refusing to acknowledge that match prepped brass didn't shoot better than unmatched brass. Some folks, apparently, would rather accept the myth than any version of the truth.

Here at *Handloader* we have always cautioned writers: The results are what they are – no baloney and made-up theory. It is what it is. Some handguns might shoot bullets sized to somewhat over barrel groove diameter best, others may not. It's the same with rifles. Results may be best in one handgun or another but lousy in another brand. One bullet may shoot better in one rifle, not so good in another.

On a more constructive note, rather than be so concerned about sizing cast bullets to within .001 inch over barrel groove diameter, experience suggests it makes more sense to use an alloy that will al-

(Continued on page 61)

9.3x62 Mauser

BULLETS & BRASS by Brian Pearce

Q: I am trying to develop handloads for the 9.3x62 Mauser in a Ruger M77 Hawkeye and need some coaching. Having had exposure to this cartridge while in the U.S. service during and just after World War II, I purchased a beautiful European-built bolt rifle by an unknown maker during the 1950s, along with a quantity of Norma ammunition. I also purchased some 286-grain steel jacketed bullets in bulk, but before I could develop loads (or even shoot much of the ammunition), my home was burglarized and the rifle stolen. Now, all of these years later, I stumbled onto the above Ruger Hawkeye rifle and bought it on the spot. I am now retired with lots of time on my hands and would like to develop handloads and begin shooting it. I would like to more or less duplicate factory loads using the 286-grain bullet. Any load data that you can offer would be greatly appreciated. And keep offering what is easily the best shooting journal on newsstands today.

– T.S.S., Gallup NM

A: *I am sorry to hear about your rifle being stolen, as many vintage European sporting rifles were beautiful works of art from true craftsmen.*

Most period 9.3x62 Mauser factory loads list a 286-grain bullet at around 2,360 fps, which are the ballistics currently advertised by Hornady, Remington, etc. I am not certain how your steel jacketed bullets will affect pressures and cannot recommend load data for them at this time. Hornady, Speer, Barnes and others offer bullets as components to handloaders, and they have been pressure-tested to eliminate guesswork. I would suggest using the Hornady 286-grain SP-RP with 54.0 grains of Ramshot TAC powder, which will duplicate the factory load ballistics you desire.

Ramshot TAC is an excellent powder for handloading Hornady 286-grain SP-RP bullets in the 9.3x62 Mauser.

.45 Colt New Frontier

Q: I consider you the leading authority on handloading and am especially fond of your writings on sixguns and cartridges, which are extremely insightful and often entertaining.

I have a question that I hope you can answer. I have a Colt New Frontier .45 Colt with a 7½-inch barrel. The serial number indicates that it was manufactured in 1978. Does this make it a second generation gun?

I have owned it for about 30 years and have not exceeded "standard pressure" handload data for the .45 Colt, typically using 250/255-grain various profile cast and lead bullets usually at 750 to 850 fps. I was reading a forum recently, which indicated that the New Frontier is stronger than the standard Single Action Army. As is often the case with Internet information, there was no evidence to support these claims. I would like to know your thoughts on that subject.

Regardless, I got to thinking about the possibility of using handloads that increase the performance of my Colt. Is it possible to reach 1,000 fps with a 250/255-grain hunting bullet? Can

you suggest a load or two? Thanks in advance for your response.

– R.H., Bridger MT

A: *With a 1978 manufacture date, your gun was produced during the "third generation" series, but some refer to this as a "second generation New Frontier," which seems to cause confusion.*

The New Frontier flattop-style frame is stronger than the standard Single Action Army frame, but the cylinder dimensions remain the same. Due to the frame's stiffer nature, it does seem to handle heavy loads better, as cases tend to extract more easily, and there are other indications of less stress to the cylinder. However, the stronger frame does not increase the cylinder strength, which must be capable of reliably handling the pressures while still offering a correct margin of safety. Personally, I don't consider the New Frontier stronger than the standard Single Action Army revolver to any important degree.

Hunting bullets can be pushed 1,000 fps in the Colt New Frontier .45 Colt.

The good news is that you can push 255-grain SWC-style bullets over 1,000 fps. Depending on the load, these might exceed industry pressure limits for the .45 Colt, which is established at 14,000 psi, but should still prove acceptable in your gun. In this application, cast bullets are still a top choice, as they pass through the bore with greater ease when pushed with a low-pressure load (such as with the .45 Colt). Try 10.0 grains of Hodgdon Longshot powder with the 255-grain Rim Rock cast SWC with gas check, which produces just over 1,000 fps from most 7½-inch barreled guns. Another option is using bullets from RCBS mould 45-270-SAA, which typically weigh 280 to 285 grains, depending on alloy, but use 9.5 to 9.7 grains of Hodgdon Longshot powder for 950-plus fps from the same length barrel. I realize this falls slightly short of the 1,000 fps you requested, but this is an excellent hunting bullet and load that have accounted for several head of big game.

.44 Special Keith Bullets —

Q: I read your article in *Handloader* No. 287 (December 2013) about the .44-caliber Keith bullet, Lyman mould 429421. For several reasons, I cannot get into casting bullets at this time, but some day

Matt's Bullets offers a .44-caliber, 255-grain Keith pattern bullet that is accurate.

plan to. In the meantime, can you suggest a company that sells quality Keith bullets that are of correct design? I will be using them in a Ruger New Model Blackhawk .44 Special, and they will be loaded to around 1,000 fps (per your advice too). Thank you for your help and advice.

– S.B.M., Piketon OH

A: *Matt's Bullets (www.mattsbullets.com) offers a 255-grain, .44-caliber Keith design that is close to the original, although it is 5 grains heavier. I am not aware of any commercial caster that is offering an exact copy of Keith's original 1927/28 period design. Matt's version is close, but most importantly it shoots well. It is cast with a Brinell hardness number (BHN) of between 14 and 15, which is plenty hard enough for the 1,000 fps .44 Special loads that you describe, and quality is good.*

Model 94 7-30 Waters

Q: I am one of the lucky souls who owns a Winchester Model 94 chambered in 7-30 Waters. It is my favorite whitetail deer cartridge. I hunt mostly from a stand, and shots are rarely over 60 yards, while 100 yards is a long shot.

The problem is that I only have a small quantity of factory ammunition left and am having difficulty finding more. Is this load no longer offered?

I handload mostly for handgun cartridges but finally decided to try my hand at a bottleneck cartridge. After purchasing dies, I began looking for bullets but cannot

find any 7mm flatnose designs. Can you suggest a source for a suitable 120- or 130-grain bullet?

– S.B., Mt. Vernon IL

A: *Federal Cartridge still offers 7-30 Waters ammunition in its Premium Rifle product line, with a Sierra 120-grain GameKing BTSP flatnose bullet. Sierra has never offered this bullet as a component to handloaders, although overruns have occasionally been sold to distributors, which were then offered to the public in bulk packaging.*

For a period Nosler offered a 120-grain flatnose and Speer produced a 7mm, 130-grain flatnose, both with crimp cannelures designed specifically for handloading the Waters cartridge, but they have both been discontinued. When developing this cartridge, Ken Waters originally used a 139-grain roundnose (with semiflat point) from RWS, but I do not see this bullet listed any longer. At this time there is no major U.S. manufacturer offering flatpoint bullets as a component for the 7-30 Waters.

While there are several solutions, some being rather costly, I might suggest using a 120- or 130-grain spitzer bullet but used in the single-shot mode to prevent the pointed bullet from contacting the primer of other cartridges in the tubular magazine and possibly setting them off during recoil. Or when you are in the stand, place a round in the chamber and the hammer in the half-cock position, then place a second round in the magazine. In this manner, the spitzer bullet cannot contact the primer of other cartridges in the magazine but still offers a second-shot option, which is rarely needed when hunting deer from a stand. Bullets should be seated for an overall maximum cartridge length of 2.550 inches to allow proper cycling. •

There are no 7mm flatnose bullets readily available as components for handloading the 7-30 Waters.

.460 S&W Magnum

CARTRIDGE BOARD by Gil Sengel

Prior to World War II, the few tales of killing a big animal with a revolver seem to have been in self-defense or a lucky shot at an inattentive critter by someone whose profession put him in the woods most of the time. Either that, or just storytelling.

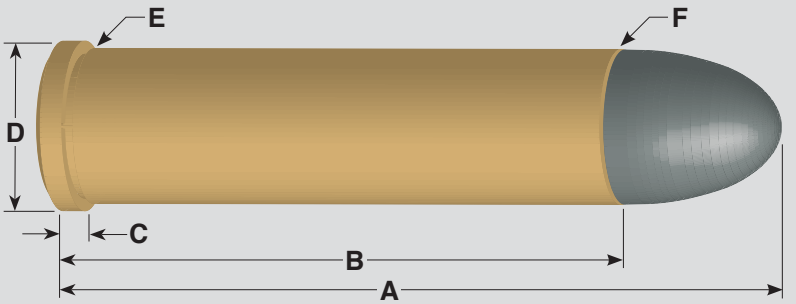
After the war a few people (for unknown reasons) began hunting with handguns and writing about it. These guns, however, didn't look much like handguns. One fellow had a .45-70 trapdoor Springfield with 10- or 12-inch barrel and an odd-looking grip behind the lock plate. Others used various single shots like Remington rolling block military rifles modified to look like pistols. Making a handgun out of a rifle violated federal law, but nobody seemed concerned. Those who pioneered handgun hunting decided that no available revolver round was reliable for the job, including the 1935-era .357 Smith & Wesson Magnum.

Appearance of the .44 S&W Magnum in 1955 gave an adequate round for 50- to 75-yard shots on large animals. When chambered in the S&W Model 29 revolver, five follow-up rounds were available if the first didn't produce the desired results. The .454 Casull came along later, increasing energy substantially and gaining a loyal following.

Handgun hunting really took off when the T/C Contender single shot arrived chambering rifle cartridges in a 10-inch barrel that easily accommodated a scope. Still, many preferred a revolver; witness the popularity of the .454 Casull, .475 Linebaugh and .480 Ruger.

Smith & Wesson then decided it wanted to regain the title of making the world's most powerful production revolver. This had been lost with the eclipse of the .44 Magnum. The result was the .500 S&W Magnum announced in early 2003. The cartridge is huge, requiring a new large-frame revolver called the X-frame. No doubt this was an expensive project, so it only makes sense to offer the new frame in more than one chambering. This resulted in the .460 S&W Magnum, released in early 2005.

When a company already produces the most powerful production revolver and cartridge, it's a bit problematic as to where it goes with new rounds. However, the .460 S&W was to be the highest velocity production revolver cartridge. Note the word *revolver*. Single-shot falling-block or break-open and bolt-action handguns fire rifle rounds that exceed both velocity and energy of the S&W cartridges. I once fired such a gun in .220 Swift (noisy) and examined one chambered in .338 Winchester



Cartridge Dimensions

A-Overall Length	2.290	**D**-Rim Diameter	0.520
B-Case Length	1.800	**E**-Head Diameter	0.478
C-Rim Thickness	0.59	**F**-Neck Diameter	0.478

Magnum. An offer was made to shoot the latter. It was declined, perhaps proving there is something to the old saying, "With age comes wisdom!"

Maximum average pressure (MAP) for the .460 S&W was set at 65,000 psi (transducer). Cor-Bon and Hornady were contracted to develop ammunition for the gun's approximate 8⅜-inch barrel. Reviewers disagree on barrel length because (I assume) a *removable* compensator is attached, factory and after-market variations of which are supposedly available. Having experience with only one of the guns, my observation is that the rifled length is 7½ inches and the compensator a little over an inch.

The case used for the .460 S&W is simply a lengthened .45 Colt, though head, web and sidewalls are no doubt thickened to withstand the high pressure. Case length is 1.8 inches. Thus, both .45 Colt and .454 Casull ammunition can be fired in the gun if there is some reason to do so. Bullets are the standard .451-inch diameter.

Initially, targeted velocity set by S&W was 2,500 fps for a 200-grain bullet. The accuracy goal was five-shot groups of an inch or less at 100 yards. During initial development, Hornady came up with a 200-grain jacketed bullet achieving 2,200 fps and today offers that load using its 200-grain FTX (FlexTip). Cor-Bon used a solid Barnes XPB to reach 2,300 fps for its first load. Of interest is that these did not generate the 65,000 psi specified for the .460 S&W, but 10,000 psi less. Extraction difficulty is supposedly the reason.

Winchester, Federal and Mag-Tech soon offered ammunition, but bullet weights started at 225 grains/2,135 fps and went to 395 grains/1,525 fps; most of these generated at least 2,000 foot-pounds (ft-lbs) of energy at the muzzle and carried 1,000 ft-lbs to 150 yards, a few to 200 yards. All this is academic today, as the "ammo shortage" has made specialty cartridges like .460 S&W unavailable to the average consumer unless he

spends hours searching the Internet and is willing to pay $3.00 to $4.00 per round, plus shipping.

This is sad. Such guns really require factory ammunition for hunting, because non-canister powders are often used to achieve advertised ballistics. Then complex crimps worked out for each factory bullet and load are required to prevent slugs working forward due to recoil. Few hunters have the time or wish to spend the money handloading to duplicate a factory load for a revolver that will be shot only once or twice a year, and what good is such a gun if it doesn't deliver its advertised ballistics?

Speaking of ballistics, I could find no .460 S&W Magnum trajectory figures except midrange numbers. These are 6.1 inches for the 200-grain Hornady and 5.5 inches for the same weight Cor-Bon load for 200 yards. Many opine the .460 S&W has a point-blank range of 250 yards when sighted dead-on at 200. Well, maybe. Group size must also be considered. Actual shooting produces clusters of 1.5 to 2.5 inches at 50 yards and 3.0 to just over 4.0 inches at 100 paces. These will theoretically be slightly more than double at 200 yards with another inch or so added at 250. Of course, all this shooting was from a benchrest with a scoped revolver. Add field conditions like freezing weather, using a makeshift rest and trying to hold up a 5-plus pound revolver, the hunter may well want to get a bit closer.

This discussion would not be complete without mentioning those folks who worry about fuzzy bears dashing out of the forest and poking them with their cold, soft noses. Since taking advantage of the .460 S&W's flat trajectory requires using the light 200- to 225-grain bullets (not ideal for bruin thumping) and glass sights of perhaps 4x, how one could hope to place a killing shot on a charging bear a few feet away with such a rig is beyond me. If bears are really a worry, carry the gun with factory sights, 275- to 300-grain slugs and get in to 100 yards or so on the game actually being hunted, even though this may compromise the gun's capabilities somewhat. One can't have it both ways.

Of far more importance, the .460 S&W is another modern handgun that should never be fired without ear protection. Blast from full-power loads is tremendous (worse than the recoil – I think). One shooter recommended *both* plugs and muffs, while another wrote that the revolver should not be shot on an indoor range regardless of protection. Good heavens!

Perhaps the best description of the .460 S&W is that it is more than adequate for any revolver application. If someone enjoys hunting big game with a revolver and doesn't mind over five pounds of iron attached to his body for hours on end, then it's definitely worth the experience.

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Alliant Reloder 26

PROPELLANT PROFILES by R.H. VanDenburg, Jr.

In *Handloader* No. 297 (August-September 2015), Alliant's Reloder 23 was highlighted, one of two new powders in Alliant's Reloder series. This column will review, and compare, the other, Reloder 26.

Reloder 23's claim to fame is lot-to-lot and shot-to-shot stability and consistency regardless of extremes in temperature and the inclusion of a decoppering agent that minimizes bullet fouling. The powder is manufactured by Bofors, the Swedish powder company that makes most of the Reloder series of powders.

Reloder 26, on the other hand, is manufactured by Nitrochemie of Switzerland, the same company that makes Reloder 17, Reloder 33 and Reloder 50. Its primary asset, according to Alliant, is the ability to generate high velocity. The ability to moderate the burn rate to keep pressure up for a longer period of time, hence producing top speeds, is governed by EI technology, a registered trademark of Nitrochemie Wimmis AG. Reloder 26 is not lacking in overall stability either, in lot-to-lot or shot-to-shot, but it is not quite the equal of Reloder 23 in stability over extremes in temperature. Much like Reloder 23, Reloder 26 has its own proprietary decoppering agent and contains no dinitrotoluene (DNT) or dibutyl phthalate (DBP).

More specifically, Reloder 26 is an extruded, double-base powder with a nitroglycerin content of 12 percent. It has a very high bulk density rating of .980g/cc that allows handloaders to get more powder in the case, helping to produce those high velocities. Dimensions, as best as I can measure them, are a granule diameter of about .041 inch and a length of .060 inch, although some granules were measured at .062 inch. Reloder 26's burning rate is a tick slower than Reloder 25 and a bit faster than Accurate's Magpro, according to the burn rate chart in *Hodgdon's 2015 Annual Manual*. This puts the powder very close to Vihtavuori's N170.

The number of cartridges suitable for Reloder 26 are few. In Alliant's online 2015 Reloader's Guide, I counted 13, ranging from the .243 Winchester to the .338 Remington Ultra Mag. I began my review with the .243 Winchester. Using the cartridge more as a hunting rifle than a varmint rifle, testing was done with Sierra's 100-grain Pro-Hunter, a flatbase spitzer bullet. Actually, I didn't have a lot of choice as Alliant only matches Reloder 26 with 100- and 105-grain bullets in this cartridge. As might be expected, Alliant paired standard strength primers with the powder in all cartridges having a case capacity no greater than that of the .30-06, i.e., about 60 grains. For cartridges holding more than that, the company recommends a magnum strength primer. This is pretty typical for any slow-burning powder, but knowing that powders get harder to ignite as the temperature drops, I experimented with both standard and magnum strength primers in the .243 Winchester.

I also discovered that Alliant's overall loaded length (OAL) for the .243 differed significantly from that used by Sierra in developing its .243 data. Alliant seated its bullet to an OAL of 2.560 inches; Sierra, in its *Rifle and Handgun Reloading Data, Edition V*, loaded the same bullet to 2.650 inches. Both lengths were worked with. Finally, in each load I started below the maximum published powder charge and worked up.

Selected Loads
Alliant Reloder 26

cartridge	bullet (*grains*)	charge (*grains*)	velocity (*fps*)
.243 Winchester	100	47.9	3,195
.25-06 Remington	120	51.3	3,012
.270 Winchester	150	60.2	3,019
7mm Remington Magnum	160	65.9	2,991
.300 Winchester Magnum	165	83.2	3,260
	180	80.2	3,075

Notes: All standard primers were Federal 210; all magnum primers were Federal 215. Velocities were measured at 10 feet from the muzzle.

Be Alert – Publisher cannot accept responsibility for errors in published load data.

Here are my findings. In a relatively small-capacity cartridge like the .243 Winchester, primer selection matters little. In fact, groups with the smallest extreme spreads were produced using standard strength primers. Best groups came from those loaded to the longer 2.650-inch overall length, but I wouldn't set this in stone, as barrels can and do vary. My rifle always gave higher velocity with the bullet out. Lastly, best results always occurred at the maximum published powder charge, and velocities do seem to exceed those published for other powders.

The next cartridge worked with was the .25-06 Remington. Here Reloder 26 was limited to 100- and 120-grain bullets; obviously, those of 115- to 117-grain weights would be as acceptable. My choice was the Speer 120-grain flatbase spitzer. As with most of the other cartridges, there were differences in the OAL between

(Continued on page 67)

PRODUCT SAFETY WARNING and RECALL NOTICE for IMR-4007 SSC POWDER

IMR Legendary Powders is officially announcing a product safety warning and recall notice for IMR-4007 SSC on the six lot numbers listed below. IMR has received reports that this particular powder in 1- and 8-pound containers may have become unstable due to possible rapid deterioration. Use of this product from the lot numbers shown on the label photo may result in spontaneous combustion, fire damage or possible serious injury.

LOT NUMBERS

10130139	**10430139**
10131139	**80425139**
10429139	**80426139**

What to do:

(1) Stop using this product immediately! Fill the powder container with water which will render the product inert and safe for disposal.

(2) Mail, email or fax a copy of the powder label showing the lot number to the contact information below and include your name, address, phone and email.

(3) Replacement choice of any other IMR smokeless powder product will be shipped to you at no charge.

(4) If you have loaded the powder subject to this recall into ammunition, we recommend that you pull the bullets, remove the powder and wet the powder with water for safe disposal.

IMR deeply regrets any inconvenience this may cause, but we believe in safety first. Contact information: IMR Powder Company, 6430 Vista Drive, Shawnee KS 66218; imrpowder.com; email: help@imrpowder.com; call 1-800-622-4366 or (913) 362-9455; or FAX (913) 362-1307.

Ivory Sixgun Stocks

FROM THE HIP by Brian Pearce

With the U.S. government's release of President Obama's "National Strategy for Combating Wildlife Trafficking" (an executive order signed into law July 1, 2013), there have been many concerns over U.S. citizens' continued right to own ivory found on musical instruments, historical museum pieces, handgun stocks or even the tiny ivory beads found on many vintage shotguns and rifle sights. The concern has been great enough that even Cabela's has suspended the sales of guns (in its Gun Libraries) that contain ivory in any form. This executive order, fueled with rumors, has slowed the sale of guns fitted with ivory.

The facts are that Director's Order No. 210 was revised May 15, 2014, and although the legal language is staggering, even contradictory, it is still legal to own ivory as long as it was legally obtained and imported, and can be verified to be pre-CITES (Convention on International Trade in Endangered Species of Wild Fauna and Flora). "DO210 does not impact possession, sale or domestic transfer of African elephant ivory." It does not allow import for commercial purposes, but it does allow hunters to import up to four trophy tusks annually. Antique ivory, defined by U.S. Fish and Wildlife (USFW) as being over 100 years old, that can be verified, is also legal.

Jim Alaimo of Nutmeg Sports crafted these pre-CITES elephant ivory stocks on a USFA Single Action Army pattern sixgun. They are of two-piece design (held by a screw), while the right panel with a carved longhorn steer head is "blind" without the presence of a screw.

I have contacted multiple USFW agents on this matter. In short, as long as the ivory is legal, it can still be installed on a favorite sixgun. However, it has been said there are "more revisions forthcoming to restrict interstate sale of ivory." As of this writing, however, it is unclear when that will happen. The point being, if you have ever thought about having a set of ivory stocks made for a favorite sixgun, now is the time to act.

There are few (if any) handgun stock materials as handsome as genuine elephant ivory. Throughout history it has been held in high regard for its strength and beauty. The color and grain structure are most pleasing to the eye, especially as it ages and turns a light yellow. Additionally, the weight density can improve the balance of many sixguns, such as the Colt Single Action Army or similar guns. Ivory's texture – neither slippery nor gritty – allows an outstanding grip that aids with shot-to-shot consistency.

For many centuries, artists have held ivory in high esteem for scrimshaw and other carvings. This tradition has been carried over into handgun stocks, with many vintage Colt and Smith & Wesson sixguns (and others) offered with factory-carved ivory. Popular themes have included birds, big game animals, flags, etc., but the popular ox head or long-

horn steer head has been a mainstay. When properly executed with talent, this is art in its purest form and adds beauty to a sixgun.

Recently I retained Jim Alaimo of Nutmeg Sports (www.nutmegsports.com) to craft a set of ivory stocks for one of my custom USFA Single Action Army pattern sixguns. He fit the stocks to the back strap and trigger guard with precision that fully equals or even surpasses the outstanding quality of late nineteenth or early twentieth century Colt factory work. Next, his artist crafted a relief-carved Helfricht pattern longhorn steer head on the right panel. This "swell" naturally fills the palm of the hand and is also handsome and a symbol of the western frontier. The stocks were of two-piece design but with a "blind" screw on the right panel so it would not interrupt the steer-head carving. Jim's work is second to none, and he has legal, pre-CITES ivory on hand that is ready to install for that custom touch to a favorite handgun. As of this writing, it takes approximately three to four weeks to fit ivory to a handgun, with carvings adding to that production time.

How long this window of opportunity will remain open for ivory to be installed on sixguns (especially for interstate trade) remains unknown.

* * *

Bowen Classic Arms Sights

Hamilton Bowen of Bowen Classic Arms (www.bowenclassicarms.com) has become known for his custom sixguns and cartridge conversions that exhibit innovation along with near flawless fit, finish and function. Bowen also offers a variety of "Metallic Revolver Sights" that are available for popular adjustable-sighted

Bowen Classic Arms offers improved replacement sights for Smith & Wesson and Ruger revolvers. Shown here is Bowen's Rough Country series that is ready to install on a Smith & Wesson Mountain Gun .44 Magnum.

sixguns from Ruger and Smith & Wesson.

The Ruger Target-Style New Model Field Sight is outstanding with positive click adjustments for windage and elevation. It features a solid, one-piece blade that is precision machined, angled slightly back and is flat on the backside, resulting in a sight picture that is black and without distracting shadows. For decades I have used these sights on several custom Ruger New Model Blackhawk Bisley revolvers in .45 Colt, .475 and .500 Linebaugh. They have been used on many successful big game hunts and have been carried into the Alaskan bush on extended hunts. They hold their zero, and being constructed of machined bar stock steel and heat-treated to control hardness, they have proven durable.

The BCA Rough Country series is fully adjustable. Windage adjustments are accomplished by turning two opposing screws.

BCA is now offering another rear sight, the "Rough Country." It is even more robust and durable and designed for Ruger and Smith & Wesson revolvers. It too is fully adjustable, matte black and has a lightly serrated blade to reduce glare for precision shot placement. At a glance, it shares a similar profile to the above Target-Style Field Sight, but rather than offering click adjustments, it features two opposing windage screws. Adjustments are accomplished by turning (or loosening) one screw, then tightening the opposing screw to move and lock the rear blade. This is similar to the system used on pre-World War II Smith & Wesson target-sighted sixguns. The BCA sight is far more precise, however, and with a large rear blade tenon that slides forward into the sight body, it offers outstanding strength. This adjustment system is simple and positively holds the rear blade when subjected to harsh field conditions or heavy recoil.

Recently I installed a BCA Rough Country sight on a Smith & Wesson 629-4 Mountain Gun .44 Magnum (along with a custom front sight). It performs flawlessly, is priced at $114.95 and can be ordered directly from BCA or visit www.brownells.com. •

FROM STEVENSVILLE, MONTANA,

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Model 58, Dangerous Game

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U.S. Model 1917 .45s

MIKE'S SHOOTIN' SHACK by Mike Venturino

U.S. Model 1917 Colt and Smith & Wesson revolvers are unique in several respects. One is that they are totally different handguns with no parts interchangeable, yet the government gave them the same designation. Another is that, to the best of my knowledge, they were the first revolvers chambered for a rimless cartridge ostensibly meant for autoloading pistols. This third point may be arguable: Despite their being just shy of a century in age, they are just as effective for today's civilian purposes as they were for military use 98 years ago.

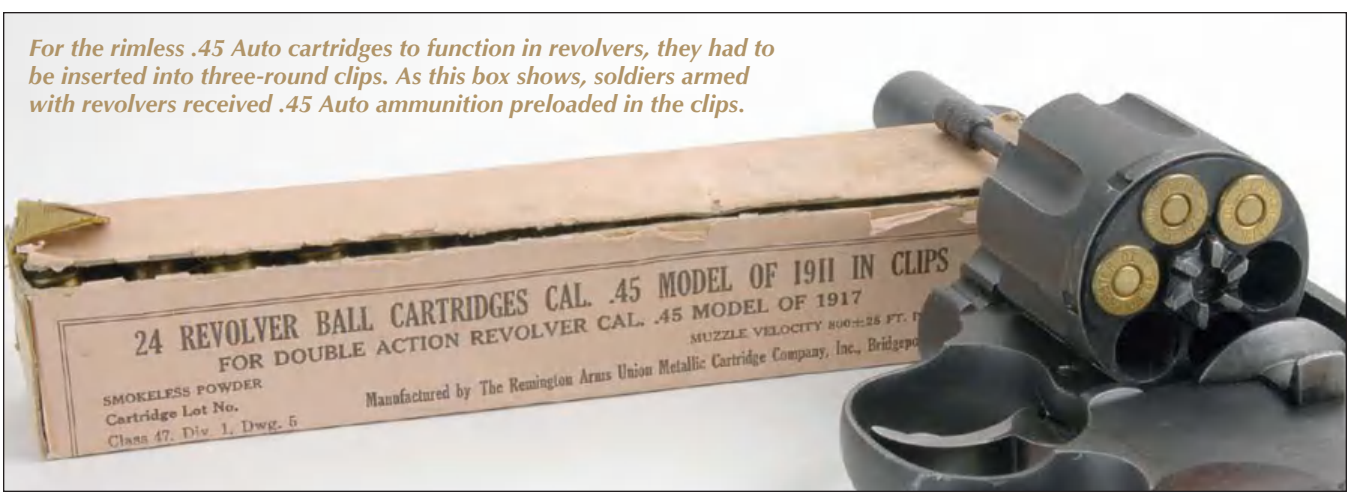
When the United States declared war on Germany in April 1917, there were not enough U.S. Model 1911 .45s to go around, so Smith & Wesson and Colt were prevailed upon to redesign their large-frame revolvers for .45 Auto. Both received the same designation, U.S. Model 1917.

That purpose was for self-protection. In 1917/18 U.S. troops carrying them on the battlefields of France were officers or others whose primary duty *was not* to fight with their personal firearm but only to protect themselves as needed. With the United States' habitual neglect of its armed forces

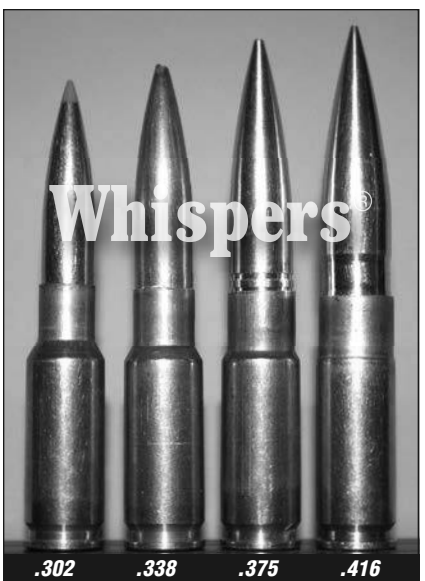
when not actually fighting, at the declaration of war in April 1917, there were severe shortages of all types of weapons.

With not enough U.S. Model 1911 .45 autoloaders to go around, the government was fortunate in that both of those above-mentioned handguns' manufacturers were already tooled up to produce large-frame, double-action revolvers. It was an easy chore to slightly redesign them for the .45 Auto. In fact, even before America joined Europe's hostilities, a bright light at Smith & Wesson had solved that problem. His device consisted of small clips stamped of steel with a capacity to hold three rounds of .45 Auto. Most U.S. Model 1917s could be fired without the clips, because case mouths headspaced on the chambers' ledges, but they could not be ejected by the revolvers' star-type extractor. (Some early Colt '17s were said to have chambers bored straight through with no ledge, but all S&Ws had them.)

The large-frame, double-action revolver then being made by Colt was the 1899-introduced New Service. Smith & Wesson adapted its 1907 N-frame Hand Ejector 2nd Model to the government's needs. Colt's version had a 5½-inch barrel, but S&W's was 5 inches. Both companies equipped their '17s with lanyard rings in the butts. Smith



For the rimless .45 Auto cartridges to function in revolvers, they had to be inserted into three-round clips. As this box shows, soldiers armed with revolvers received .45 Auto ammunition preloaded in the clips.



& Wesson stuck with its standard high-polish blue finish, but Colt put on a duller finish than used for the civilian market. Grips for both versions were plain walnut, and sights consisted of a blade front with a groove down the revolver's top strap for rear alignment. An interesting tidbit concerns those '17s pulled from storage and reissued for World War II. Most were given a Parkerized finish.

It has often been written that New Service revolvers chambered for .45 Colt had barrel groove diameters of .454 inch, which had to be reduced to .451 inch to properly fit the .45 Auto. I cannot testify to this as true, but I do have a 1922 Colt barrel spec sheet that gives both .45 Colt and .45 Auto barrel groove diameters as .451/.452. I have measured my own '17 Colt and S&W revolver chamber mouths. The latter will not accept a plug gauge larger than .454 inch. My two Colts accept .455-inch plugs.

Something else often written in the past is that both makes of Model 1917s have shallow rifling to coincide with jacketed bullets as used in military .45 Auto ammunition. My Colt spec sheet, admittedly of post-World War I production, says both .45 Auto and .45 Colt barrels have .0035-inch deep rifling, which is exactly the same depth as rifling used on all barrels from .22 to .45 caliber. Often written in the past is that bullet casters needed to pour bullets for '17 sixguns of a hard alloy, otherwise they would "strip" on the shallow grooves. Mine do not.

Cast of 1-20 (tin-to-lead) alloy, my bullets are as accurate as jacketed FMJs through all three of my U.S. Model 1917s. However, that is not to say my cast bullet shooting with those three handguns has been trouble-free. In fact, I've experienced a problem since my very first handloads were fired from an S&W '17 in the summer of 1968. That has been bullet pull during recoil with cast designs that are sans a crimping groove. It will happen to the extent that a bullet nose protruding from a chamber

Mike prefers .45 Auto-Rim cases for shooting his Model 1917s. His favorite load uses the 225-grain full wadcutter from Redding/SAECO mould 453.

will prevent cylinder rotation. A roll crimp over the bullet's ogive, or even the heaviest taper crimp, does not stop bullet pull 100 percent. A roll crimp in supplied groove or cannelure does stop it, but of course, such .45 Auto handloads are not suitable for autoloaders.

About 1921 the ammunition manufacturer Peters introduced a case design labeled .45 Auto-Rim. Merely a .45 Auto case adapted with a thick rim, the cartridge negates the need for clips. I much prefer Auto-Rim cases for my .45 Auto revolvers.

The standard load for my 1917 .45s consists of 4.7 grains of Red Dot in Starline .45 Auto-Rim brass under bullets cast in Redding/SAECO mould 453, a 225-grain full wadcutter. The load shoots close enough to point of aim with my three '17s that I've never worried about regulating their sights.

An indication of the practicality of Model 1917 revolvers is that both Colt and Smith & Wesson kept the idea of .45 Auto revolvers in production for decades, and the latter company even resurrected it in the twenty-first century.

* * *

My Apologies

In my previous column (*Handloader* No. 298) on bottlenecked handgun cartridges, I typed the Cor-Bon cartridge as .440, when the one I was talking about was the .400 Cor-Bon. The former is formed from .50 AE, but the latter is from .45 ACP. •

.451 Versus .452 Sized .45 Bullets

PISTOL POINTERS by Charles E. Petty

In regard to John Haviland's review of the NOE bullet mould (*Handloader* No. 297, August-September 2015), a reader wrote, ". . . it is fairly obvious that this particular reviewer either has little or no in depth experience with casting and shooting cast bullets or else he has a bias against these types of bullets." The reader's main gripe was that John had used 0.451-inch diameter sizing for his test, and "everyone knows" 0.452 inch is standard. He also opined that John's 2- to 3-inch groups from his Gold Cup would have been better had the bullets been .452 inch. Finally he suggested we hire, ". . . someone who is thoroughly conversant with casting and shooting lead alloy bullets."

There was more, but I think you get the picture. I make no claim for expertise in casting – although I've done a lot of it – but shooting them is another matter. I do it almost every time I shoot, and accuracy testing is bread and butter.

The first place to look is the SAAMI standards for .45 ACP match ammunition, and there are bullet dimension standards for both jacketed and lead bullets. For lead the maximum is 0.4530 with a -0.0030 tolerance. That means a bullet as small as 0.450 is acceptable, so John's .451 is okay. Standards for barrel dimensions are .442 bore and .450 groove. So as long as the bullet fully engages the rifling, chances are it will be stabilized.

Bullet sized .451 inch (left) with a loaded round, then .452-inch bullet and round (right).

Now SAAMI's word is law to commercial manufacturers, and most handloads follow along. That probably is proof enough that John didn't do anything wrong, but I want to take the next step. My everyday .45 ACP load is 4.0 grains

A Les Baer Boss was used to test the loads for accuracy.

of Titegroup with the 200-grain LSWC, so it was easy enough to load 50 rounds of each diameter bullet in Starline brass with Federal primers and set up a Ransom Rest. To have some hope of statistically relevant results, three, 10-shot groups were fired at 50 yards from a Les Baer Boss with a bore measuring 0.443 inch.

The thing about the letter with which I took the most exception was the writer's absolute certainty that he had the only right answer. He based some of his conclusions on results from cast bullets in rifles – an apples/oranges judgment. He cites 1 MOA groups in .30-caliber rifles with cast bullets, but 3 to 4 MOA with a .45 pistol is cause for rejoicing. I don't doubt his "over 30 years experience casting lead alloy bullets." Well, I've been doing this stuff even longer and am certain of only one thing: In shooting there are precious few absolutes.

The writer went on to say that John's Gold Cup accuracy might have been better had he used a .452-inch bullet. I've never seen John's pistol, but his results are very much in line with my experience, perhaps even better than average.

To test the accuracy of the writer's claim, all it took was to size my customary .452-inch cast bullets (Valiant 200-grain LSWC) down to .451 inch. RCBS was kind enough to lend me a sizer. It was a simple matter to size the already lubricated bullets without disturbing or applying more lube. The bullets are described as "hard cast," which is an alloy with 1.5 percent tin and 6.0 percent antimony. The hardness test revealed a Brinell hardness of 9.

Fifty bullets were sized to .451 inch, and 50 were taken from the same box and checked to see that they were .452 inch. They were all loaded on a Dillon 650 in once-fired Starline brass using Federal primers and a charge of 4.0 grains of Hodgdon Titegroup to an overall loaded length of 1.23 inches. Three, 10-shot groups of each were fired from the Ransom Rest at a target 50 yards downrange. Federal Gold Medal 185-grain SWC ammunition was fired as a control. The results are listed in the table.

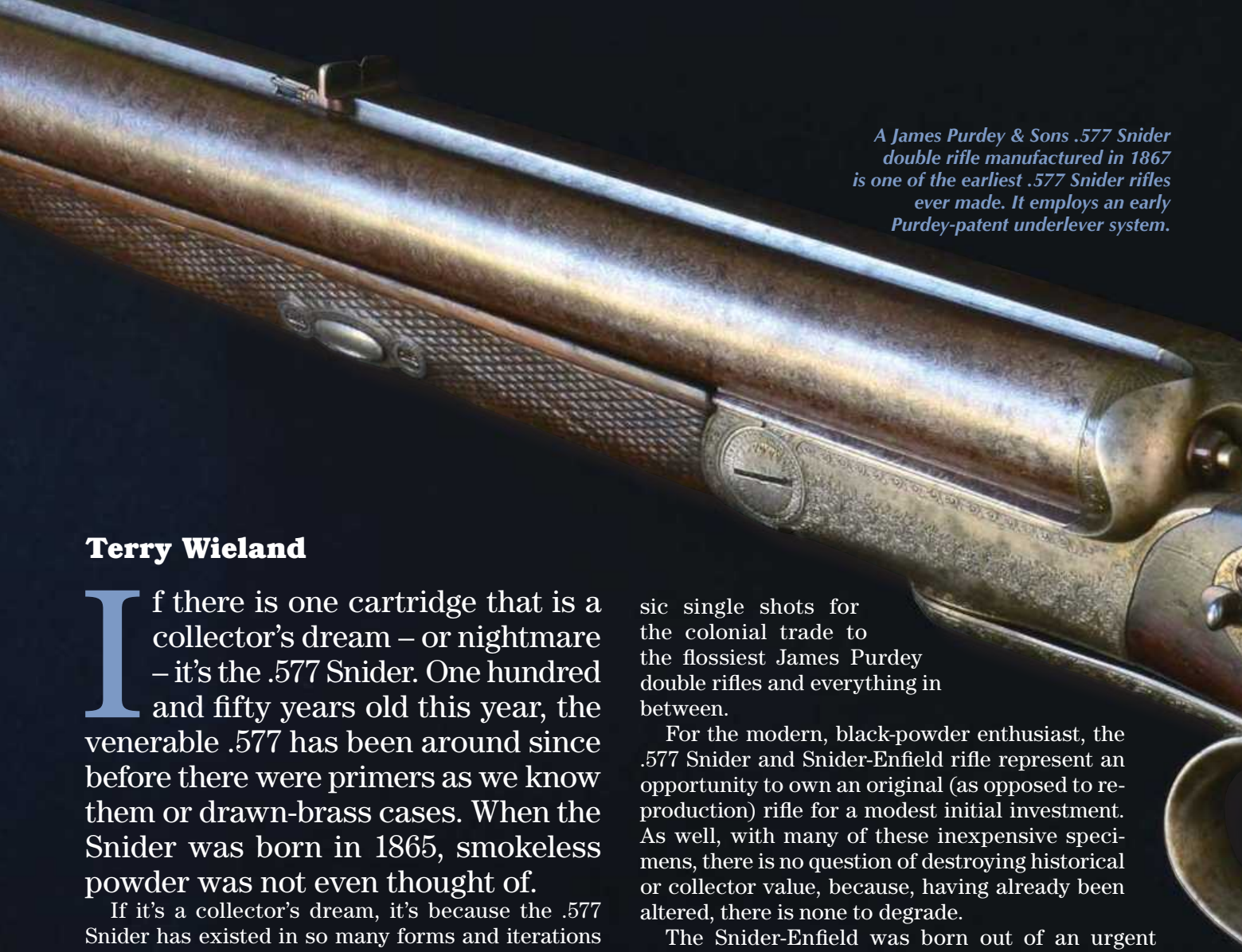
To say that the results were surprising is a vast understatement. I would have been willing to bet that there would be little difference. An industry friend with many year's experience with lead bullets wasn't surprised at all. "There are simply too many variables to justify generalizations like that," he said.

One other thing I've learned from testing a lot of guns and loads is that results are rarely constant, and if you repeat the test on another day, the answers might not be the same. They should show a similar relationship. Now if we repeated the test 10 or 100 times, we should be able to be more emphatic in our claims, but the real bottom line here is that it is impossible to predict what any load will do until you test it in a gun of known accuracy. ●

Shooting Results

load	velocity (*fps*)	extreme spread (*fps*)	1	2	3	average
			(*inches*)			(*inches*)
Federal	786	44	2.52	1.85	2.12	2.16
Sized .451	726	52	2.89	2.41	3.20	2.83
Sized .452	736	33	3.40	3.49	3.91	3.60

Notes: Velocity is instrumental with screens at 12 feet. Accuracy is a 10-shot group at 50 yards from a Ransom Rest.



A James Purdey & Sons .577 Snider double rifle manufactured in 1867 is one of the earliest .577 Snider rifles ever made. It employs an early Purdey-patent underlever system.

Loading the .577 Snider

Terry Wieland

If there is one cartridge that is a collector's dream – or nightmare – it's the .577 Snider. One hundred and fifty years old this year, the venerable .577 has been around since before there were primers as we know them or drawn-brass cases. When the Snider was born in 1865, smokeless powder was not even thought of.

If it's a collector's dream, it's because the .577 Snider has existed in so many forms and iterations over the last century and a half, and a collector could limit himself to just that one cartridge and nothing else and still never see them all. Another variation, another wrinkle, lies around every corner of its history. The nightmare is the fact that, no matter how hard you try, you will never know everything there is to know.

One could say the same about Snider rifles. Although it was developed for, and mostly chambered in, the Snider conversion of the 1853 Enfield muzzleloader, the .577 went on to a long and varied career as a cartridge for hunters, explorers and adventurers. It was chambered in everything from the most basic single shots for the colonial trade to the flossiest James Purdey double rifles and everything in between.

For the modern, black-powder enthusiast, the .577 Snider and Snider-Enfield rifle represent an opportunity to own an original (as opposed to reproduction) rifle for a modest initial investment. As well, with many of these inexpensive specimens, there is no question of destroying historical or collector value, because, having already been altered, there is none to degrade.

The Snider-Enfield was born out of an urgent need on the part of the British Army to replace the muzzleloading Enfield with a breechloading rifle. In 1864 a special committee of the War Office met to consider the problem. Because money was short and warehouses around the world were filled with 1853 Enfields, they decided the best course of action in the short term was to convert those muzzleloaders.

Of the approximately 47 proposals that came in from inventors around the world, the committee narrowed the field to the nine most promising. In the end, the contract was awarded to Jacob Snider of Philadelphia. At the time, breech-loading was in its infancy. The centerfire, drawn-brass cartridge as

Our Common Ancestor

we know it did not exist, even in someone's fancy. Although it seemed everyone was pursuing the ideal of breech-loading, they were taking different approaches. Some mechanisms used paper cases containing powder and ball that were sliced open by the closing of the breechblock and then ignited by conventional percussion caps. Others, like the Dreyse needle-gun, enclosed the cap inside a paper cartridge that was pierced by a needle.

Snider's invention specified only a cartridge "of some kind," and Col. Edward Boxer and his staff at the Woolwich Arsenal laboratory embarked on the development of a cartridge that would work in the Snider conversion. Snider's invention consisted of a hinged breechblock that swung up and out of the breech. It presumed some sort of solid cartridge case that would need to be extracted, and an extractor was incorporated in the breechblock.

Colonel Boxer therefore began with an iron washer, or "base disc," and built a cartridge case upon it. The earliest forms resembled later paper shotshells, with a base disc, base cup of copper with a base wad inside and paper walls. There was a "primer pocket" in the base into which an anvil and a percussion cap were inserted separately. Eventually, the walls were made of coiled copper sheeting, and the primer components were combined into a self-contained cup. This became the famous Boxer primer, in use to this day, while the cartridge was the "Boxer cartridge."

Whether Colonel Boxer, as an army officer and employee of the state, had the right to patent such designs in his own name and profit by them is questionable. Certainly, lawsuits resulted, especially one by George Daw, an English gunmaker who is credited with the introduction of the "central fire" system in a self-contained cartridge.

Throughout all this, the .577 Snider (as it came to be known) evolved through many design changes, minor and major. By 1866, the pattern was more or less standard, thousands of Enfields were being converted and issued to troops, and the Snider-Enfield be-

An early military copper-coil and paper-wrapped .577 Snider cartridge.

Loading the .577 Snider

A Cape gun in .577 Snider and 20 gauge by Jos. Braddell & Son of Belfast. This gun was probably made in the late 1860s.

came the British Army's infantry weapon until 1871, when the Martini-Henry was adopted as a longer-term solution.

The rush in which all this took place had its effects on the .577 Snider. For one thing, any ammunition that came later had to fit even the earliest Snider chambers. The designers at Woolwich had been operating under several constraints. One was the bore diameter of the 1853 Enfield (.577 inch) that became the new cartridge's bullet diameter. Early chambers were given straight walls, with the difference in diameter filled by the thickness of the coiled brass and paper-covered walls of the early cartridges.

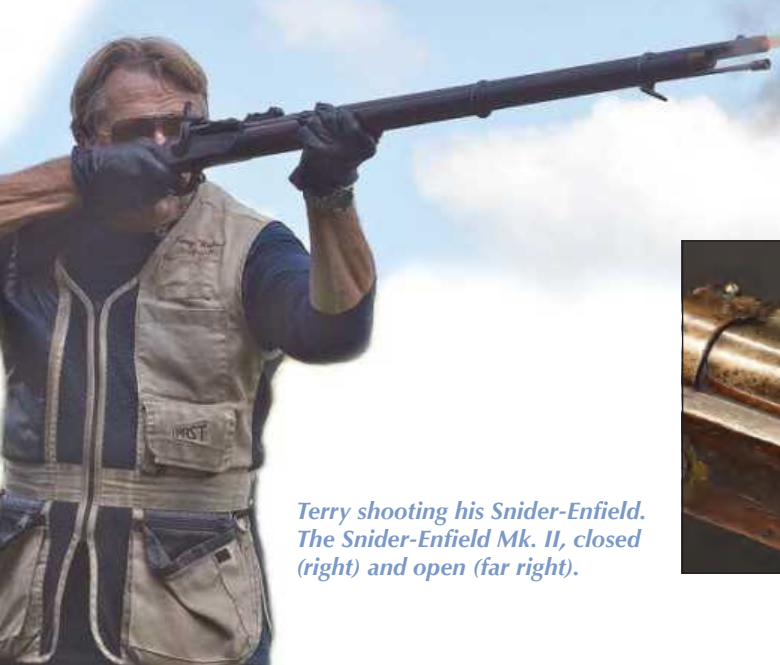
When drawn-brass cartridges came into use some years later, the thin brass had to be necked down to hold the bullet. This resulted in a bottleneck cartridge, but chambers are all straight (or nearly straight). The end result is wide variations in chamber dimensions, the need for dedicated brass and, sometimes, even specially made sizing dies.

Since the Snider-Enfield was essentially an 1853 Enfield that loaded from the back rather than the front, initial ammunition used exactly the same components: a 525-grain Minié ball propelled by 70 grains of powder. Early on, the designers decided the 525-grain bullet was too heavy and moved to a 480-grain Minié. With 70 grains of powder, this bullet was rated at 1,250 fps. This combination remains the standard load for the .577 Snider to this day.

By coincidence, across the Atlantic, the other great name in primer development, Col. Hiram Berdan, was working on a very similar project to convert the Springfield musket for the American army. Berdan arrived at a cartridge – the .58 Berdan – that was so similar to the .577 Snider that, in the early twentieth century, the Canadian Dominion Ammunition Co. produced a cartridge that could be used in either one. Called the .57 Snider, the Dominion round was about .25 inch shorter than the Snider and would fit either chamber and bore.

Unlike the Snider-Enfield, Berdan rifles and cartridges are rare collectors' items. Anyone with a hankering to see how it feels to shoot one need look no farther than the common Snider-Enfield. Close your eyes, and you'll never know the difference.

The modern Snider-Enfield shooter is faced with two immediate problems: brass and bullets. Brass is available from a number of sources. Bertram of Australia makes it, and it is sometimes available from Huntington Die



Terry shooting his Snider-Enfield.

The Snider-Enfield Mk. II, closed (right) and open (far right).

(1) .577 Snider military paper-wrapped cartridge, (2) Kynoch civilian load, (3) Kynoch with copper-tube bullet and the (4) .57 Snider made by Dominion Cartridge Co. of Canada.

Specialties. Track of the Wolf in Minnesota offers some made-in-the-USA brass with the correct headstamp at about $4 per round. This may seem expensive, but it lasts forever if cared for correctly. Cases can also be made from 24-gauge brass shotshells.

I obtained my brass from Bob Hayley (Hayley's Custom Ammunition) in Texas and quickly found that standard swaged brass would fit my Snider-Enfield but not the Snider barrel of a Braddell Cape gun. For the latter, Bob swaged some brass smaller, and it works just fine. This brings up a problem anyone loading .577 Snider might encounter, and that is the need to fit brass to an individual chamber. Hayley's brass is a little less expensive than Track of the Wolf, and offers the option of having it sized smaller to fit a particular chamber.

Now bullets. Again, I got mine from Hayley, who casts 480-grain Minié bullets in an old mould that was modeled on the even older Ideal 575213. It is a roundnosed hollowbase with three driving bands and a meplat. The original Enfield bullet had sawtooth driving bands, which helped keep the bore clean, but that is about the only difference. Track of the Wolf offers bullets that are closer to the original but measure .585 inch.

Track of the Wolf recommends loading its brass, which is straight-walled rather than bottleneck, with a powder-wad-roundball combination.

C-H provides .577 Snider dies as a standard item and will even make them undersized if required. They are one-inch dies, however, and require an oversized press like the Redding Ultramag. Similarly, C-H makes shellholders for the .577, but a 24-gauge shotshell holder usually works.

Having taken care of the purely mechanical aspect of loading for the .577 Snider, there is another real issue, which is getting anything approaching the rated velocity – and then hitting anything.

The Cape gun is by Joseph Braddell & Son, a well-known Belfast shooting and fishing shop in the Victorian era. It combines the .577 Snider with a 20-gauge shotgun barrel and has one standing and four folding leaf sights graduated from 50 to 250 yards.

The sights on the Snider-Enfield are standard military ladder sights from the era, graduated up to 800 yards. Contrary to belief, these settings were used for laying down volley fire, not for sniping; a more common range for accurate fire would be 100 yards, or maybe 150.

I also have an E.M. Reilly 20-gauge hammer double that began life as a .577 Snider double rifle with 24-inch barrels. What velocities it might have reached with black powder is hard to say, but it would not have been much. Still, out to 50 yards or so – well within range for repelling borders in the China Sea or fighting off attacking Pathans – it would have been a fearsome firearm. Another favorite use of the .577 Snider was in *howdah* pistols, the double-barreled guns of last resort carried by tiger hunters to deal with big cats that attacked them atop their elephants. Truly, it is a versatile cartridge!

The accompanying table shows

Loading the .577 Snider

Bob Hayley's mould was custom made years ago and was patterned on the even earlier Ideal 575213 mould. One difference is the saw-tooth driving bands of the earlier bullet, which reduced fouling buildup.

Coaxing old-time performance out of the .577 Snider with new components requires some juggling. Of the pure black powders, Hodgdon's Olde Eynsford 1½ Fg performed best in both guns.

the velocity results of five load variations tested in both the Snider-Enfield and the Braddell. Being of a conservative bent, I started with 70 grains of Schuetzen Fg (from Graf & Sons) behind Hayley's bullet, and measured an even 800 fps from the 28-inch barrel of the Cape gun. Bob's own load, which uses GOEX Fg, delivered 1,050 fps from the Snider-Enfield (36.5-inch barrel).

It is possible to employ five grains of SR-4759 as a priming charge behind the black powder, and I tried this in both rifles with both Schuetzen Fg and FFg. I also used 70 grains of FFg by itself with both; finally, 70 grains of Hodgdon's new premium Olde Eynsford 1½ Fg.

As can be seen from the table, the results achieved are all over the map, and a little puzzling in places. They don't answer the velocity question, which really needs to be done before properly addressing the question of accuracy. With the Enfield, the highest velocity came with the Schuetzen

Table I **.577 Snider Handloads**

bullet (*grains*)	powder	charge (*grains*)	velocity (*fps*)	extreme spread (*fps*)
Snider-Enfield Mk. II* (36.5-inch barrel)				
480 Minié	GOEX Fg	70.0	1,050	19
	Schuetzen Fg	70.0	908	23
	+ 5.0 grains of SR-4759*			
	Schuetzen FFg	70.0	1,017	36
	Schuetzen FFg	70.0	1,138	14
	+ 5.0 grains of SR-4759*			
	Olde Eynsford 1½ Fg	70.0	1,119	22
Joseph Braddell Cape Gun (28-inch barrel)				
480 Minié	Schuetzen Fg	70.0	800	17
	Schuetzen Fg	70.0	940	10
	+ 5.0 grains of SR-4759*			
	Schuetzen FFg	70.0	981	17
	Schuetzen FFg	70.0	1,071	7
	+ 5.0 grains of SR-4759*			
	Olde Eynsford 1½ Fg	70.0	1,064	13

* SR-4759 is used as a priming charge.

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FFg/SR-4759 combination, but one case stuck in the chamber, suggesting this is about as high as one should go with those components. That would be the load to pursue, however, along with priming some Olde Eynsford with SR-4759. I also have a pound of DuPont Bulk Shotshell (no longer available), which has a good reputation as a priming charge with black. That's hardly a long-term solution, however, since it is no longer made, but the same is true of SR-4759.

With the Braddell, the most promising load is also the Olde Eynsford. In its case, shortfalls in velocity are due to barrel length, so increasing the powder charge accomplishes nothing. I am very reluctant to use any powder finer than FFg, so the answer seems to be to experiment with FFg of different brands, with and without a priming charge.

If all this seems very inconclusive, I apologize. The idea was really to get the two guns shooting again, and work from there. One thing learned from this was to work with one rifle at a time; because brass is not interchangeable, developing test loads becomes a logistical nightmare. At least now, however, both the Enfield and the Braddell are once again hurling big lead balls downrange, with enough accuracy to deck a target at 100 yards and enough force to give a resounding clang. •

Below, the "copper-tubed" bullet employed an insert of copper tubing in the nose to encourage rapid expansion – the earliest iteration of the principle employed in the Remington Bronze Point and other modern bullets. Right, the first general-issue Snider-Enfield rifles were to troops in Canada. Dominion Cartridge produced ammunition until well into the twentieth century, including this dual-purpose round for use in the Snider and the American-designed .58 Berdan.

.243 Winchester

Loads for Modern Big Game Bullets

John Haviland

Skeptics of the .243 Winchester continually downplay the cartridge as marginal for shooting even skinny deer. However, countless numbers of hunters young and old brush aside such idle talk and every season shoot .243s to successfully kill deer, pronghorn, black bears and even elk. In recent years new powders and better bullets have improved the cartridge's performance. These advances might well keep the naysayers at bay.

When the .243 Winchester was introduced in 1955, it was initially loaded by Winchester with thin-jacketed, 80-grain bullets for shooting small game and 100-grain bullets constructed with a heavier jacket for deer. In the years since, an abundance of big game bullet styles and weights have been introduced. Hornady alone sells five, .24-caliber bullets ranging in weight from 80 to 100 grains for big game, and Nosler lists seven hunting bullets from 85 to 100 grains.

One-hundred-grain bullets of standard construction (a lead core and copper-alloy jacket) are still a good choice for the .243 Winchester. I have a couple of Remington red cardboard boxes of bullets from the early 1970s stamped on the end with "6MM 100 Grain PTD SPCL." The 1971 Remington catalog states these Pointed Soft Point Core-Lokt bullets are "a fine bullet for bringing down game at long range," and "another good selection for deer, mountain lion, black bear, jaguar." Long ago I shot a mule deer with one

New 6mm hunting bullets provide a flat trajectory and carry plenty of punch for pronghorn.

of these bullets at about 150 yards. The buck turned to run, wobbled a few steps and fell over. The bullet had gone through its lungs and out the far side. At the time I thought the bullets had a muzzle velocity of at least 2,900 fps, but years later a chronograph registered a muzzle velocity of 2,800 fps.

My wife also shot a mule deer buck with one of the Core-Lokts, but she fired the bullet from a short-barreled 6mm Remington, the .243 Winchester's ballistic twin. The distance was 40 yards, and the deer never took another step. She has also shot other mule deer and at least a dozen pronghorn with other 100-grain bullets. Sierra spitzers (now Pro-Hunter) and Hornady Spire Points (Inter-Lock since 1977) punched clear through the animals.

My oldest son borrowed his mother's 6mm Remington for his first pronghorn hunt. Paul practiced shooting the rifle at targets and ground squirrels during the summer. By fall he was confident shooting out to 200 yards. Just as importantly, he was quick to drop into a sitting or prone shooting position and bring the rifle to bear. On opening morning, Paul followed the backside of a long ridge to stalk a band of pronghorn. He lay prone at the crest of the ridge, but the pronghorn had bunched up, with the bucks shielded in the middle. After a time they strung out at a slow walk up the hill at 80 yards.

"Is that a safe shot?" Paul asked, hunter education still fresh in his mind. "Yes," I said. He fired at a buck near the front of the line. Where the doe came from on the far side of the buck is still a mystery, but it dropped dead from the bullet through the head. The buck the bullet was intended for jumped forward and fell.

We walked over and the buck was shot right behind the shoulder. The Sierra bullet had sailed out the far side of the ribs and hit the doe, going clear through its head. Paul was worried he had broken the law, but he had a buck and a doe permit.

Powders with burn rates from Ramshot Big Game on the fast-burning side to IMR-7977 on the slow-burning end work best for hunting weight bullets loaded in the .243 Winchester.

Those bullets punching clear through all those game animals dismisses the criticism of insufficient penetration of .243-inch bullets. The trend, however, is toward keeping bullets nearly whole while they expand. This is accomplished several ways. Nosler accomplished this a long time ago with its Partition bullets, with a dividing wall between a front and rear lead core. Sometimes a portion of the front core remains attached, and occasionally it's wiped off. The rear core always remains intact with the jacket.

Bonding a lead core to the jacket is a second method. These bullets include the Hornady InterBond, Norma Oryx, Nosler AccuBond and Swift Scirocco. These bullets readily expand to a wide frontal width. Except for the Oryx, these bullets are constructed with long ogives and pointed plastic tips that make them relatively long for their weight.

Another technique is making bullets of a single metal with a deep hollow tip. Cutting Edge Match/Tactical/Hunting and Barnes Tipped Triple-Shock bullets are made of copper. Cutting Edge ESP Raptors are brass, and Hornady GMX and Nosler E-Tips are gilding metal. Barnes, Hornady and Nosler cap the hollowpoints with a plastic tip that pushes back on contact to initiate expansion. These bullets have a rather long bearing surface for their weight, which can increase pressure. To compensate, Nosler suggests beginning with starting loads when loading its E-Tip bullets. To lessen pressures, Barnes started cutting grooves around its original X-Bullets and called them Triple-Shocks. The .24-caliber, 80-grain Tipped Triple-Shock bullet has three grooves that are .015 inch narrower than full bullet diameter in which material displaced by the rifling lands is deposited. Hornady GMX bullets also incorporate relief grooves, but not as deep. These bullets are usually a lighter weight, to keep their length short enough to stabilize when shot through standard twist rifling.

I've never retrieved a .24-caliber bullet from game shot with .243 or 6mm cartridges. To see how they expand, I shot some into water-soaked hardcover books at 50 yards. Impact velocities were about 2,700 fps. Like the books, the recovered bullets made for some interesting reading. The 100-grain Remington Core-Lokt and Sierra Pro-Hunter bullets

.243 Winchester

.243 Winchester Handloads

bullet (*grains*)	powder	charge (*grains*)	overall loaded length (*inches*)	velocity (*fps*)	group (*inches*)
Remington Model 783, 22-inch barrel:					
77 Cutting Edge Match/Tactical/Hunting*	W-760	40.0	2.70	3,043	1.63
	Hybrid 100V	40.5		2,976	1.77
	IMR-4451	40.5		2,934	2.05
85 Federal Vital-Shok Trophy Copper (factory load)				3,023	1.38
90 Nosler AccuBond	IMR-4451	41.0	2.68	2,978	2.68
	IMR-7977	49.0		2,992	1.16
	MRP	44.5		2,828	2.50
90 Nosler Ballistic Tip	IMR-4831	43.5	2.68	2,953	3.60
	Hybrid 100V	43.0		3,149	2.58
	MRP	45.5		2,785	2.53
		45.5	2.71	2,743	.80
90 Nosler E-Tip	Hunter	42.0	2.68	2,746	1.60
	H-4831	42.0		2,822	3.12
	IMR-4451	38.5		2,798	1.77
95 Hornady SST*	H-4350	42.0	2.70	2,970	.58
	Power Pro 4000-MR	44.0		2,995	.84
	Varget	35.0		2,751	1.16
100 Remington PSP Core-Lokt	Power Pro 4000-MR	41.5	2.65	2,756	1.13
	RL-17	40.0		2,823	1.26
	MRP	43.0		2,646	1.03
	IMR-7977	48.5		2,849	1.43
100 Sierra GameKing*	IMR-4064	36.0	2.65	2,822	1.05
	IMR-4350	41.0		2,839	.83
Cooper Model 22, 24-inch barrel:					
85 Barnes Triple-Shock	A-4350	43.0	2.71	2,972	.48
	Hunter	44.0		3,087	.97
	Magpro	51.0		3,096	.32
	RL-19	44.0		2,911	.67
	VV-N560	46.5		3,070	1.07
90 Swift Scirocco	A-4350	39.0	2.71	2,687	.76
	Hunter	39.5		2,781	.95
	RL-19	44.0		2,981	.71
		45.0		3,068	.93
	VV-N560	43.0		2,792	1.26
95 Hornady SST	H-4350	42.0	2.69	2,999	1.29
	Varget	35.0		2,807	.72
	A-4350	40.0		2,687	.61
	RL-19	42.5		2,744	.81
	VV-N160	42.0		2,903	.21
95 Nosler Ballistic Tip	IMR-7828 SSC	45.0	2.71	2,855	1.11
	VV-N560	44.0		2,864	1.11
	RL-22	42.5		2,740	.51
	Big Game	39.5		2,923	.87
100 Nosler Partition	IMR-7828 SSC	45.5	2.72	2,923	1.25
	VV-N560	44.0		2,902	1.16
	RL-22	42.0		2,614	1.08
	Hunter	40.0		2,645	1.24
100 Sierra Pro-Hunter	IMR-7828 SSC	45.0	2.65	2,840	1.14

* These three loads used CCI 200 primers.

Notes: Winchester cases were used throughout, and Winchester Large Rifle primers were used in all loads, except where noted with an asterisk (*). Velocities were recorded 10 feet in front of the muzzles of the two rifles. Group size is for three shots at 100 yards.

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Recovered from water-soaked books is a Barnes 85-grain Triple-Shock (left) and a Nosler 90-grain E-Tip (right).

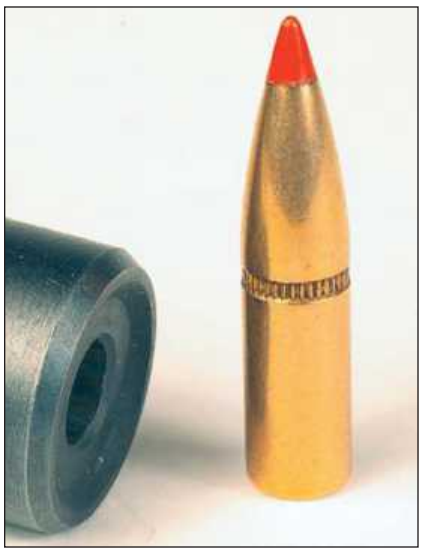
Left is a recovered Nosler 90-grain AccuBond and (right) a Swift 90-grain Scirocco II.

A Nosler 90-grain Ballistic Tip (left) and a Remington 100-grain Core-Lokt (right) were recovered from water-soaked books.

expanded flatly and shed their cores, but they tore silver dollar-sized holes through the paper and penetrated fairly deeply. Nosler 90-grain Ballistic Tips mashed flat to their thick rear bases and lost their cores. Hornady 95-grain SSTs performed equally well. Swift Scirocco 90-grain bonded bullets peeled back two-thirds of their length, but lost only 10 grains of weight. The Nosler 90-grain AccuBonds looked similar but shed 35 grains of weight. Nosler 100-grain Partitions looked picture-perfect with a bit of the front core remaining in front of the dividing walls and retained weights of 70 grains. The Partitions penetrated only 2 inches less than the Barnes Triple-Shocks and Nosler E-Tips. The petals enclosing the hollow cavities of the Triple-Shock and E-Tip bullets flare out, and somewhere along their path the front of the bullets are an inch wide. The petals curled back along the bullets' long and solid shanks and continued drilling narrower holes. They stopped 20 inches in and held onto all of their original weight.

The .243 Winchester has a large case capacity compared to its bore diameter. Plus, .24-caliber hunting bullets, especially single metal bullets, are relatively long for their weight. For example, Cutting Edge 77-grain M/T/H bullets measure 1.171 inches long and the Nosler 90-grain E-Tip bullet is 1.138 inches long. Those two factors require relatively slow burning powders to

.243 Winchester



This Hornady 95-grain SST bullet shows hunting-weight bullets for the .243 Winchester are long for their diameter, so relatively slow burning powders produce the highest velocities.

obtain the highest velocity from these hunting bullets – Ramshot Big Game on the fast burn-rate side to H-1000 on the slow end work the best.

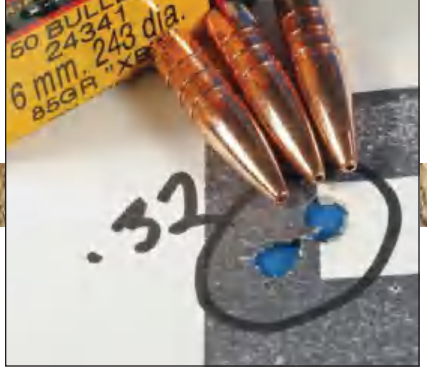
Accurate, Hodgdon and IMR-4350 powders are always a good choice in the .243 Winchester. From a Remington 783's 22-inch barrel,

H-4350 fired Hornady 95-grain SST bullets just short of 3,000 fps. The three 4350's accuracy is always good, with the 783 grouping SSTs in .58 inch from H-4350 and Sierra 100-grain GameKings in .83 inch with IMR-4350. A-4350 helped the Cooper Model 22 shoot three Barnes 85-grain Triple-Shocks into .48 inch. In fact, nearly every bullet was very accurate when shot through the heavy-barreled Model 22 with a variety of other powders, such as Hunter, MagPro, Reloder 19 and 22.

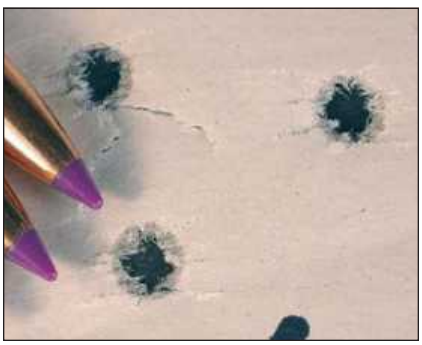
The .243 Winchester's velocities were uniform too. Sierra 100-grain GameKing bullets had an extreme velocity spread of only 5 fps paired with IMR-4350 from the Remington 783 rifle. Shot from the Cooper rifle, Nosler 100-grain Partitions varied only 12 fps when shot with IMR-7828 and 21 fps with VV-N560. The lightweight Barnes 85-grain Triple-Shock varied 8 fps combined with VV-N160, 17 fps with RL-19 and 25 fps when fired with MagPro.

The velocities listed in the accompanying load table are not all that fast from 22- and 24-inch barrels. None of the 100-grain bullets broke 3,000 fps. Only Hybrid 100V shot 90-grain bullets faster than 3,100 fps. Listed velocities, however, are sufficient to expand regular or elaborate bullets through a deer's ribs out to several hundred yards. That's enough, too, because hunters who carry a .243 Winchester for hunting big game seem to display a restrained atti-

Left, Brandon Ray used a .243 Winchester on this Texas pig. Right, Kim Bagley shot this nice pronghorn buck with her .243.



Left, IMR-4350 is still a great powder for .243 Winchester; this group was shot with Sierra 100-grain GameKing bullets. Above, a heavy-barreled Cooper Model 22 .243 Winchester shot this group with Barnes 85-grain Triple-Shocks loaded with Magpro. Below, Nosler 90-grain Ballistic Tips grouped .80 inch at 100 yards and showed better accuracy when seated for a maximum cartridge length of 2.71 inches.



tude. They are in it for a shot at game standing at a sure distance. Just because they see a pronghorn so far out it's at the curve of the earth is not an indicator to try a shot. My wife has hunted 40 years with a 6mm Remington. She has never attempted shooting a deer much over 100 yards or pronghorn beyond 250 yards, and she has never wounded an animal. ●

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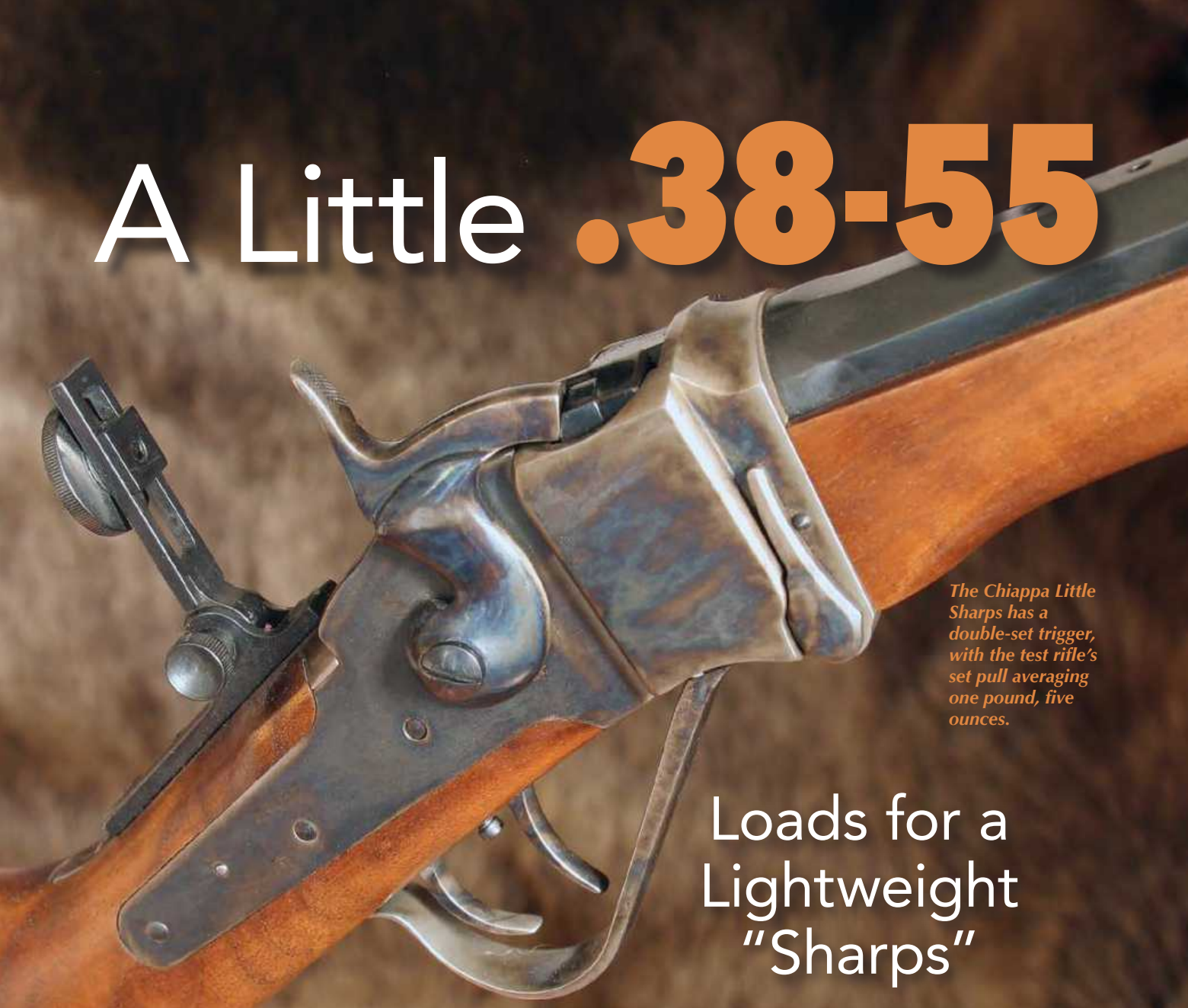
A Little .38-55



The Chiappa Little Sharps has a double-set trigger, with the test rifle's set pull averaging one pound, five ounces.

Loads for a Lightweight "Sharps"

John Barsness

Some men experience a slight euphoria from buying vehicles and firearms, a pleasurable reaction that must be somehow connected to ancient desires, such as trading for a horse or new spear. It's interesting to note what can make rifle loonies start quivering internally. For me, it's often actually handling a type of rifle I've been interested in for a while. (In this instance, "triggers" is not a pun but the perfect word.)

The scene was a local gun show, where I entered carrying a case holding a long-desired rifle that, after a couple of years, had lost its aura. This can happen with long-desired rifles after we shoot the mystery out of 'em. Some people keep demystified rifles, especially the unusual loonies who never sell firearms – though many of their rifles never had any mystery in the first place.

Behind the first table to the right of the entrance stood my friend Olli Ollila, who's been buying, shooting and selling hunting firearms for decades. Olli's gun-show tables never hold vast quantities

of firearms, but (as someone once said of the young Katherine Hepburn) what he has is choice. Over the years we'd made a few deals, including a swap for a choice leather leg'o'mutton case for one of my side-by-side shotguns.

After saying howdy, Olli asked: "What's in the case?"

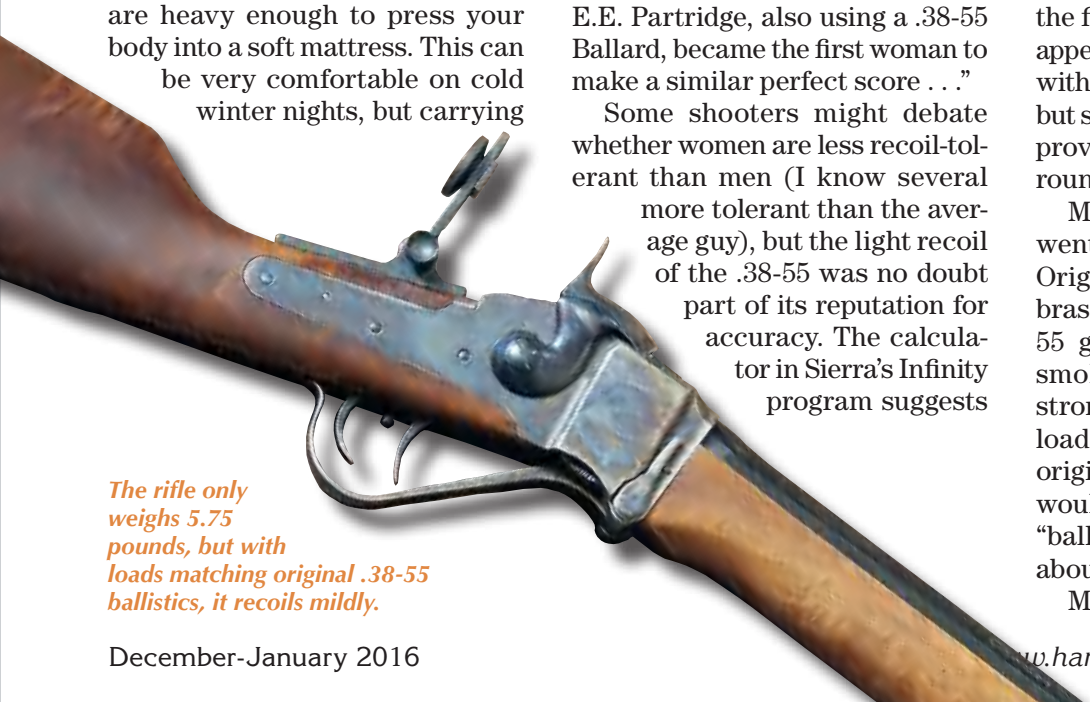
I took out the rifle and handed it to him. He asked if I'd be interested in a trade, pointing out a pair of Chiappa "Little Sharps" rifles, scaled-down versions of the famous Model 1874 Sharps. Both were close to new, with case-colored receivers, tang aperture sights, double-set triggers, 26-inch octagonal barrels and nice wood, one a .218 Bee and the other a .38-55. I'd heard about occasional problems with these, but Olli had range-tested both and said they worked fine, and Lyman sells the same basic rifle in .22 Hornet and .38-55 as the Lyman "Ideal Model" Sharps. After two minutes of debate and examination, we swapped straight across. I picked the .38-55 because plenty of nifty little varmint rifles were already in the safe but no nifty little big game rifles chambered for any sort of black-powder cartridge.

One minor tragedy of American black powder cartridge rifles is most are as heavy as a buffalo robe, and robes from a mature bull are heavy enough to press your body into a soft mattress. This can be very comfortable on cold winter nights, but carrying such a rifle around the hills doesn't appeal to me anymore, the reason several nifty but normal-sized, black powder cartridge rifles had lost their mystery.

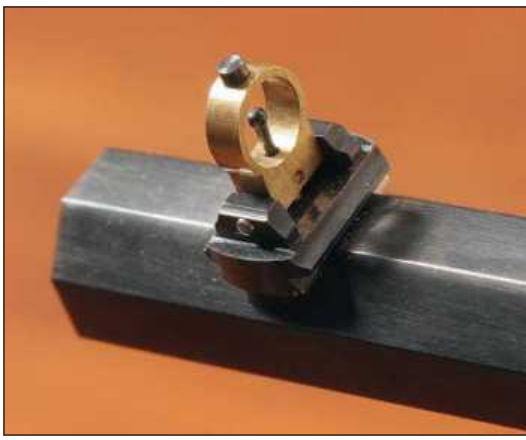
Back home I put the Little Sharps on an accurate beam scale, which balanced at 5 pounds, 12 ounces. Wow! This may seem light for a big game rifle, but many modern rifles weighing around 6 pounds are chambered for much harder-recoiling cartridges, and I didn't intend to try to modernize the old round anyway.

Understanding the .38-55's history isn't just interesting but essential to handloading the cartridge. The .38-55 appeared in 1884, introduced by Marlin for its 1881 Marlin lever action and Ballard single-shot target rifle. (The round is often called the .38-55 Winchester, but exactly why I've never been able to determine.) The case is a slightly lengthened version of the .38-50 Ballard round introduced in 1876, with a 255-grain bullet at 1,300+ fps. The .38-55 soon became a popular target round. In Ken Waters' "Pet Loads" feature (*Handloader* No. 61, May 1976), he wrote: "The first perfect score on the Standard American 12-ring Rest Target for 10 shots at 200 yards was fired in June 1895 by H.L. Willard with a .38-55 Ballard. And as evidence of its easily tolerable recoil, Mrs. E.E. Partridge, also using a .38-55 Ballard, became the first woman to make a similar perfect score . . ."

Some shooters might debate whether women are less recoil-tolerant than men (I know several more tolerant than the average guy), but the light recoil of the .38-55 was no doubt part of its reputation for accuracy. The calculator in Sierra's Infinity program suggests the original .38-55 factory load produces about 10 percent less recoil energy than a 100-grain .243 Winchester factory load.



The rifle only weighs 5.75 pounds, but with loads matching original .38-55 ballistics, it recoils mildly.



The front sight is a type often used on older American rifles that can be flipped between a globe post (above) and a brass blade (below).

The .38-55 appeared just before smokeless powder, and soon hunters (as they generally do) started wanting more zip. Ken Waters states the first smokeless ammunition to appear was the "High Velocity" load with a 255-grain bullet at 1,593 fps, but smokeless powders quickly improved and soon a "High Power" round appeared listed at 1,700 fps.

Metallic cartridge cases underwent a similar rapid evolution. Original .38-55 cases were folded brass, the reason they could hold 55 grains of black powder, but smokeless powder required a stronger case. The High Velocity load used what Waters says was originally called a "solid" head but would later become known as the "balloon" head, capable of holding about 48 grains of black.

Modern extruded cases have

A Little .38-55

Loads worked up featured the same Lee Precision bullet, with the smokeless load using Accurate 5744 and Lee Alox lube and the black-powder load using Swiss 1½Fg and SPG lube.

even less capacity. Starline and Winchester .38-55 cases I have on hand both weigh 130-some grains, and neither will hold more than about 48 grains of GOEX FFFFg (the smallest granulation) even when using a drop tube. If a handloader wants to include a "grease cookie" under a typical cast bullet, about 46 or 47 grains of most brands of FFg are all that will fit, so it's puzzling how GOEX's present website data lists 55 grains of coarse-grained Fg with a 255-grain cast bullet.

Another problem with the .38-55, along with other older cartridges, is variations in bore diameter. Ken Waters' three test rifles were all older originals – a Ballard Union Hill, Winchester 1885 and Winchester 1894 – with groove diameters varying from .3785 to .383 inch.

I'd previously owned a couple of .38-55s, both lever actions, one an 1893 Marlin that had originally been a .30-30 before the badly corroded barrel was rebored, and the other a recent Winchester Model 94. The Marlin's groove diameter was .378 inch and the Winchester's only .377, typical of "modern" .38-55s designed to shoot jacketed bullets. Most are .375 inch in diameter, though Barnes offers two 255-grain Originals, one .375 and the other .377 inch.

Case length has also varied. Originally .38-55 cases were about 2.125 inches long, depending on the maker, but in 1926 the Sporting Arms and Ammunition Manufacturers' Institute (SAAMI) was formed to resolve dimensional discrepancies in ammunition and firearms. SAAMI eventually standardized case length at 2.085 inches, between the 2.0 inches of the .38-50 Ballard and original .38-55 cases. However, Starline makes .38-55 cases in both 2.125- and 2.085-inch lengths to accommodate crimp grooves in various bullets.

In addition, back when all SAAMI pressures were listed in CUP (copper units of pressure) due to the then-prevalent copper-crusher system for measuring pressures, the maximum average pressure of the .38-55 was 30,000. Eventually SAAMI started using more accurate electronic testing, listing pressure in psi (pounds per square inch) rather than CUP, but as of mid-2015 it didn't list any pressure for the .38-55. However smokeless pressures are measured, the present SAAMI maximum may be too much for very old .38-55 rifles, the reason Ken Waters listed three levels of rifle strength and handloads in his 1976 "Pet Loads." As a result of all these factors, handloading the .38-55 can require even more tuning to the individual rifle than is required for most cartridges.

After weighing the Little Sharps, I slugged the barrel to determine bore and groove diameters, which turned out to be .376 and .380 inch, respectively. Cast bullet companies offer various models for the .38-55 in diameters from .376 to .381 inch, but Lee Precision makes one of its aluminum moulds for the .38-55. As far as I know, these are the least expensive bullet moulds available, but I've had excellent luck with them over the years. This particular model was listed as casting a 250-grain flatnose bullet of .379

.38-55 Handloads

bullet (*grains*)	powder	charge (*grains*)	overall loaded length (*inches*)	muzzle velocity (*fps*)	group (*inches*)
First range session, 50 yards, five-shot groups:					
247 Lee cast, SPG lube	A-5744	20.0	2.613	1,410	1.04
"	Blackhorn	26.0	"	1,363	1.56
Second range session, 50 yards, five-shot groups:					
247 Lee cast, SPG lube	KIK FFg	45.0	2.613	1,356	1.95
"	GOEX FFg	45.0	"	1,306	2.94
"	Swiss 1½ Fg	45.0	"	1,356	1.51
"	Trail Boss	9.5	"	1,107	1.49
Third range session, 100 yards, four-shot groups:					
247 Lee cast, SPG lube	A-5744	20.0	2.570	1,383	1.44*
247 Lee cast, Alox Liquid	"	20.0	"	1,396	2.49
247 Lee cast, SPG lube	Swiss 1½ Fg	46.5	"	1,363	2.46
247 Lee cast, grease cookie	"	46.5	"	1,290	6.85

* The first shot from a cleaned bore was a high flyer. The next three shots measured 1.44 inches.

Notes: The Chiappa's barrel is 26 inches long with a rifling twist of one turn in 18 inches. All handloads used Starline brass and CCI 200 primers.

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inch diameter, but it's relatively easy to vary the diameter of cast bullets by using different lead alloys.

Contrary to what some handloaders firmly believe, cast bullets do not need to be sized and often shoot more accurately if they come out of the block at groove diameter or slightly larger. My most recent experiment along this line appeared in "Beating the .22 Rimfire Shortage" in *Handloader* No. 290 (May-June 2014), where gas-check bullets cast of wheelweight lead in Lyman's 225438 mould not only shot best unsized, but even when sized were more accurate without gas checks. So it sure doesn't hurt to try.

I started by melting 4 pounds of the classic alloy containing 92 percent lead, 6 percent antimony and 2 percent tin. The resulting bullets measured .379 inch so went back into the pot, along with about 6 ounces of pure lead. This slightly softer alloy resulted in bullets .380 inch in diameter, and after weight-sorting the batch, I ended up with 104 averaging 247 grains, ±0.5 grain.

Left, during the final shooting at 100 yards, the Swiss black powder and Alox-lubed A-5744 loads shot to the same point of impact, grouping eight rounds (circled) into less than 3 inches. Above, during the second range test at 50 yards, Accurate 5744 proved to be the most accurate smokeless powder, though both Blackhorn 209 and Trail Boss also shot well.

I'd also ordered a set of Lee Precision dies, and full-length sized some new 2.085-inch Starline cases to round out the mouths. A few bullets were lubed with SPG and seated to just touch the lands over two smokeless powders commonly used in black-powder rounds, Accurate 5744 and Blackhorn 209. The Lee sizing die was designed to hold bullets as small as .375 inch,

A Little .38-55

and the cast bullets resulted in a visible bulge in the cases.

After a pair of preliminary shots with the A-5744 load at a 25-yard target to roughly sight in the tang aperture sight, a five-shot group with each load was shot at 50 yards. The A-5744 group was a little smaller, but both were adequately accurate.

My black-powder supply included three that might work well, and five-round batches were loaded with 45.0 grains of each powder using a drop tube, and thin wads punched from a cardboard milk carton were placed on the powder before seating the bullets.

Some of the cast bullets were also loaded with 9.5 grains of Trail Boss, and out of a sense of duty, three Barnes 255-grain, .377-inch Originals were loaded using a charge of Alliant Reloder 7 that had shot well in my Winchester 94. I didn't even bother trying any Sierra 200-grain or Hornady 220-grain flatnoses, since they're both smaller than the Chiappa's bore diameter.

Test-shooting again took place at 50 yards, to compare point of impact with the loads from the first two sessions. Accurate 5744 again won the smokeless division, and Swiss 1½ Fg was the most accurate black powder. The Barnes 255-grain bullet produced a sort of buckshot pattern and kicked way too much for a light, little rifle.

This test revealed that the seating depth of the Lee bullet was slightly long for shooting black powder, because a few of the rounds refused to chamber due to fouling in the throat even after pushing a wet patch through the bore between shots. Back at the bench, I discovered the fired cases were just the right diameter for the .380-inch bullets to seat slickly without resizing the case. After seating, the bullets were taper

crimped using the full-length die with the decapping rod removed.

The final range test took place at 100 yards, firing four shots each of two variations on the Accurate 5744 and Swiss 1½ Fg loads. Instead of using SPG for one batch of A-5744 loads, I rolled the bullets around in Lee Alox Liquid then let them dry overnight. I'm not one of those casters who likes to spend hours making bullets, and as-cast bullets lubed with Alox Liquid are about as quick and easy as it gets.

I upped the charge of Swiss black powder to 46.5 grains, and for one, four-round batch used a "grease cookie" of SPG between disks of waxed paper over the powder, as outlined in Paul Matthews' fine book *Loading the Black Powder Rifle Cartridge* (Wolfe Publishing, 1993). Unfortunately, I hadn't made any grease cookie loads for a while and suspect the bottoms of the hand-lubed bullets weren't totally free of SPG. The cookies probably stuck to the base of the bullets, because both velocity and accuracy were erratic.

The other three loads shot just fine. The first shot with the SPG-lubed, A-5744 load resulted in a high flyer, probably because of the clean bore, scrubbed with Shiloh Sharps Bore Cleaner after the previous session. The next three went into 1.44 inches, 1.5 inches above and slightly to the right of center.

The morning had started off almost dead calm, but soon a breeze rose to 3 to 4 mph on my Minox Windwatch, and the other three loads all landed about 2 inches to the right. The eight shots from the Alox-lubed A-5744 loads and non-cookie Swiss loads went into a combined 2.90 inches, spread slightly vertically, which might be due to 60-something eyes shooting iron sights. Horizontally the eight shots only spanned 1.97 inches.

This level of accuracy will do for any practice or hunting with a very light Sharps .38-55, and no trace of leading appeared in the bore any time during the shooting. There will probably be some more tweaking of the black-powder load, but the quick-and-easy smokeless load is done!

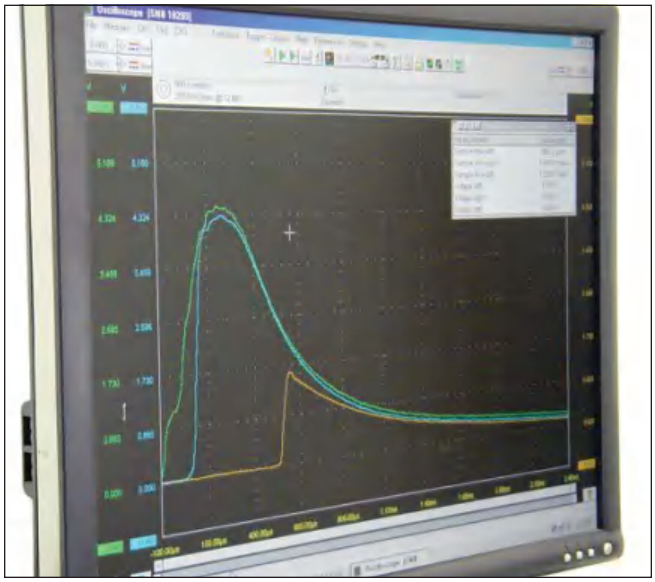
Choosing the correct powder and burn rate for load optimization will result in loads that perform exactly as desired.

Sixgun Handloading

Understanding Revolver Cartridge Pressures

Brian Pearce

There is probably no single subject that is more important to handloaders than pressure. Too little can cause erratic velocities, squib loads, bullets to stick in the bore and other maladies – all potentially dangerous. Too much pressure can cause primers to come loose, become perforated or deform excessively. Brass can split or separate, and overloads can destroy guns and cause injury. The subject is very complex; therefore, this article focuses only on sixgun cartridges.



Piezoelectric (with transducer) testing accurately converts pressure to pounds per square inch (psi). This system is extremely accurate and is replacing the older, less accurate copper crusher (CUP) measuring system.

During the 1890s smokeless powder began appearing in factory ammunition, resulting in most major revolver manufacturers upgrading steels and endorsing the use of ammunition loaded with smokeless powder by around 1900, although there were many top-break revolvers manufactured that were still intended for low-pressure, black-powder loads. At approximately the same time, jacketed bullets began appearing in select cartridges. In studying and shooting early smokeless ammunition, factories were on a learning curve, as some loads performed rather poorly. In some instances, pressures were too low and bullets were known to stick in the bore, while other loads displayed excess pressure, especially in black powder-era guns. However, early testing equipment was less than precise, powders were inferior and only available with limited selections.

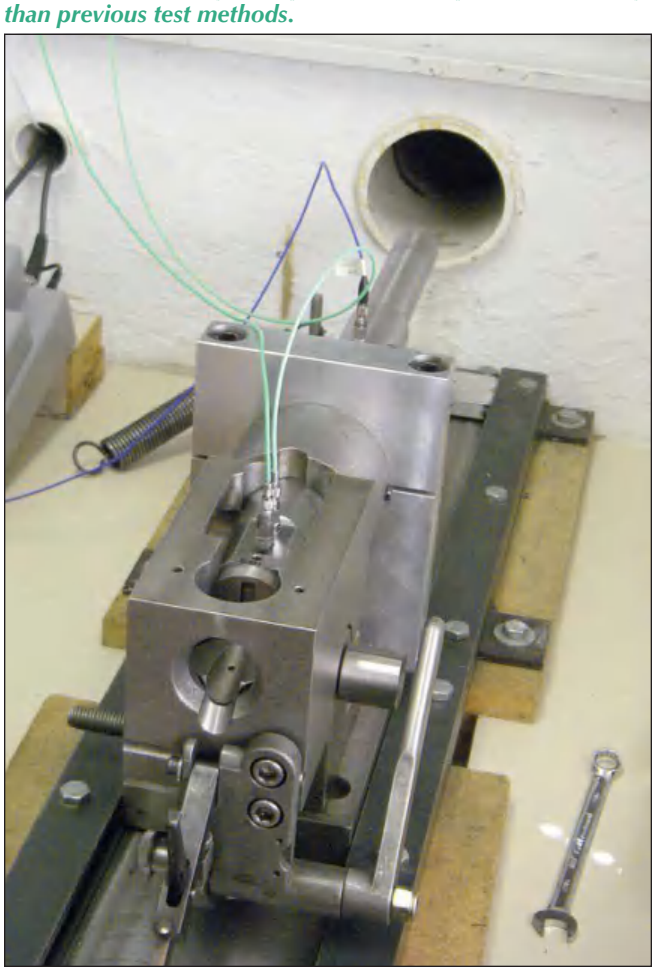
With the need for industry standardization, the Sporting Arms and Ammunition Manufacturers' Institute (SAAMI) was established in 1926 in an attempt to create industry standards regarding chamber dimensions, case specifications, bullet diameters, overall cartridge lengths and pressures. Pressures are determined based on the type of actions/guns that a given cartridge is fired in. In other words, cartridges used in guns with weaker actions/cylinders are necessarily loaded to lower pressures. Members of SAAMI produce factory cartridges to established specifications so that regardless of the make of gun or ammunition, all combinations are "safe and interchangeable, reliable and quality." The organization is overseen by voting SAAMI members that are generally gun, ammunition or component manufacturers. Ammunition companies that are not members of SAAMI are not governed by its standards and can manufacture ammunition to any specification and specify the guns for which their loads are intended. For example, several companies offer high-pressure .45 Colt loads designed for modern guns, such as the Freedom Arms Model 83, Ruger Redhawk and Blackhawk, etc., and warn to never fire these cartridges in weaker guns such as the Colt SAA or guns with similar strength.

The international counterpart of SAAMI is the Commission Internationale Permanente (C.I.P.). This organization often sets pressure guidelines that are different (often higher) than SAAMI. This explains why imported ammunition is sometimes ballistically different than domestic loads. Furthermore, C.I.P. cartridge specifications are sometimes different than those established by SAAMI, which has resulted in some interchangeability issues.

Pressure is created when a primer ignites the powder and expanding gases build pressure and push (or propel) the bullet down the bore. The "peak" pressure is of particular interest, as practically all cartridges have a SAAMI-assigned maximum average pressure (MAP) rating, with the exception of some early black-powder cartridges. These MAP figures are not set in stone and can be changed if problems arise, which actually happens on a somewhat regular basis. A modern example is the .500 S&W Magnum, which when it first appeared was listed with a MAP of 60,000 psi that has now been lowered to 58,000 psi.

Here is where the confusion sometimes begins: Pressure testing methods for many decades were

Modern pressure measuring methods, such as this piezoelectric transducer system, provides better pressure accuracy than previous test methods.



conducted using the "crusher pressure measurement" system that utilizes a special pressure barrel with a sensor hole strategically drilled in the side of the chamber. A copper gas check is installed between the case and the drilled hole (to prevent powder erosion to the steel parts), while a copper crusher (a solid cylindrical piece) is placed between a piston and the anvil screw that serves to secure the chamber. When the test cartridge is fired, the case ruptures and drives the piston into the copper cylinder, crushing it between the piston and the anvil screw. The amount of "crushing," or shortening, to the copper cylinder is then measured using a micrometer, and a Tarage Table is referenced to determine the approximate pressure. Each lot number of copper crushers are tested for known metallurgy and calibrated for a specific Tarage Table by the manufacturer. No electricity is required, which indicates the age of this system.

Revolver Cartridge SAAMI Maximum Average Pressure

cartridge	MAP
.32 S&W Long	15,000 psi
.32 H&R Magnum	21,000 CUP
.327 Federal Magnum	45,000 psi
.38 S&W Special	17,000 psi
.38 S&W Special +P	20,000 psi
.357 Magnum	35,000 psi
.357 Remington Maximum	48,000 CUP
.41 Remington Magnum	36,000 psi
.44 S&W Special	15,500 psi
.44 Remington Magnum	36,000 psi
.45 Auto Rim	15,000 CUP*
.45 Colt	14,000 psi
.454 Casull	65,000 psi
.460 S&W Magnum	65,000 psi
.480 Ruger	48,000 psi
.475 Linebaugh	50,000 psi
.500 S&W Magnum	58,000 psi**

* .45 ACP is 21,000 psi, while +P is 23,000 psi
** reduced from 60,000 psi

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The cartridge case on the far left was tested using the old "copper crusher" (CUP) system, while the case on the right was tested using a transducer. Below, barrel twist rate can have an effect on handgun cartridge pressures but generally only applies to high-pressure (60,000 to 65,000 psi) cartridges.

This test method is old and slow but results in an estimated pressure in copper units of pressure (CUP). Depending on the operator, calibration and metallurgy accuracy, this system can produce widely varying results.

For example, years ago when CUP testing was still in widespread use, I sent sample ammunition (all one lot number) to two different ballistics labs. When the results were returned, one lab listed average pressures at almost 36,000 CUP, while the other lab listed it at over 45,000 CUP. This huge variance, around 23 percent or nearly 10,000 CUP, shows why so many loads and data sources list considerable differences in load data.

The more modern testing method is piezoelectric pressure measurement, which directs electronic readings through a transducer that is mounted to the chamber wall of the pressure barrel. Upon firing, a special crystal within the transducer is compressed. That in turn sends an electronic charge – based on the amount of pressure – to a computer that converts it to pounds per square inch (psi). The case is not ruptured, but there is a small

impression left from contact by the transducer and subsequent pressures. This method is much more accurate than the older CUP system, but it can be subject to operator error due to calibration, etc. Nonetheless, it offers far more sophisticated readings and identifies pressure curves that were not possible with the copper crusher system.

It is important to note that CUP and psi are not the same, and neither are they interchangeable. Pressure figures from one to another cannot be estimated, as this is an apples-to-oranges comparison and varies from one cartridge to another. An example of the change is the .357 Magnum, which formerly had a MAP of 46,000 CUP but is now listed at 35,000 psi. While the two figures are not the same, the pressures were also reduced due to problems that had surfaced as a result of excessive pressure.

Below, these .357 Magnum loads, generating around 33,000 psi, were fired in two different revolvers. The ruptured primer (right) is the result of a too long firing pin, not excess pressure. Right, these .44 Magnum test cases were fired at (left to right): 44,100 psi; 56,700 psi; and 71,200 psi. Note the edges of the primers are still of "normal" appearance. The load at far right is twice the pressure of SAAMI prescribed maximum average pressures. Primer appearance is not an accurate method to determine pressure.

Left, Keith Anderson at work loading test ammunition in the Western Powders lab. Above, powder charges are carefully weighed in a temperature- and humidity-controlled lab.

Placement of the transducer on straight-walled cartridges (for psi measurement) is one-half of the transducer diameter plus .005 inch behind the base of the seated bullet. One of the reasons for this positioning is that most straight-walled cartridges reach peak pressure before the bullet leaves the case, which is especially apparent with faster-burning powders. In many instances, peak pressure is achieved just as the bullet begins to move. The pressure curve is steep and peaks quickly, which even applies to most magnum cartridges; however, some loaded with very slow burning powders won't reach peak pressures until after the bullet exits the case. Examples include the .454 Casull and .460 S&W Magnum.

Sophisticated transducer pressure measurement has helped put to rest many old beliefs regarding sixguns and pressures. For example, a few decades back, many bal-

.357 Magnum Powder Burn Rate and Velocity in Revolver and Rifle

bullet (*grains*)	powder	charge (*grains*)	overall loaded length (*inches*)	Ruger GP100 velocity (*fps*)	Marlin 1894CB velocity (*fps*)
158 Hornady XTP-HP	A-2	7.0	1.580	1,082	1,290
	A-5	9.8		1,155	1,526
	A-7	10.5		1,105	1,451
	A-9	14.4		1,298	1,771
	A-4100	14.8		1,270	1,730
	Titegroup	5.9		1,016	1,235
	CFE Pistol	7.1		1,014	1,277
	Longshot	8.2		1,112	1,452
	H-110	16.8		1,213	1,787
	Bullseye	6.9		1,088	1,302*
	Unique	7.9		1,158	1,385
	2400	14.9		1,276	1,744

* sensitive to lot number variance

Notes: Loads were fired in a Ruger GP100 with a 4-inch barrel and in a Marlin Model 1894 with a 20-inch barrel. Starline cases and CCI 500 primers were used throughout. Maximum overall loaded length: 1.590 inches; maximum case length: 1.290 inches; trim-to length: 1.280 inches. All loads have been pressure tested between 32,500 and 35,000 psi and are considered maximum. This table illustrates how faster-burning powders do not produce maximum velocities, especially in the longer rifle barrel.

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listicians believed revolvers gave higher pressures than a pressure barrel, but that has not proven to be true. It is true that not all revolvers produce the same results or pressure levels (neither do pressure barrels), but revolver pressures are generally similar or less than a pressure barrel.

The ammunition industry has been busy converting MAP for all sporting cartridges from CUP to psi. Testing is expensive, time consuming and cannot be accomplished overnight. Practically all current handloading manuals that are available today contain data that is (or was) tested using both pressure methods.

SAAMI members can load cartridges to a more or less exact MAP, and some certainly do. However, most companies choose to hold the pressures 5 to 10 percent below maximum, and some loads have been tested that are as much as 25 percent below maximum. This leaves room for uncontrollable variables. In other words, a slightly out-of-spec case or bullet, a gun with too small a throat, etc., might cause pressures to increase, but it will not be so much as to damage the gun or cause injury. This conservative approach also leaves a margin of safety for the character who leaves a box of ammunition rattling around on the dash of his pickup, sometimes for years, during extreme heat, which will almost always increase pressure. Most labs test ammunition in controlled temperature and humidity and choose to leave this margin of safety based on experience.

Many beginning or ultraconservative handloaders fear damage to their favorite sixgun if they load ammunition that bumps or even slightly exceeds MAP guidelines. To help ease those concerns, let's consider proof loads. Specified high-pressure proof loads are fired in new revolvers manufactured in the U.S. to assure that *that* gun has no hidden flaws in the steel and will be safe when fired with industry standard pressure loads by the consumer. Testing the revolver with proof loads cannot damage the gun or result in it becoming out-of-specification. Generally, proof loads are between 30 to 40 percent higher than MAP for a given cartridge. For example, MAP for the .44 Remington Magnum is 36,000 psi, while proof loads typically run just over 50,000 psi. The .454 Casull has a MAP of 65,000 psi, with proof loads typically generating between 87,000 and 93,000 psi!

Generally speaking, I don't suggest exceeding MAP guidelines, as this will accelerate wear, stress steel parts and is certain to shorten the life of a revolver; it also narrows the important margin of safety that is essential to safe handloads. There are exceptions for experienced handloaders,

such as the previously mentioned .45 Colt, which has a MAP of 14,000 psi. Modern, solid-head cases handle increased pressure but *only* when housed in sixguns such as the ".44 Frame" Ruger Blackhawk, Redhawk, Freedom Arms Model 83 and others. A few other cartridges are exceptions as well, when shot in modern revolvers: .32 H&R Magnum, .38-44, .44 Special, .45 Auto Rim, etc.

When assembling handloads for a sixgun, small factors can often affect pressure, sometimes significantly. One that is often overlooked is primer choice. I have seen loads vary in pressure by around 25 percent with no other changes except substitution of primers. Primer appearance tells very little about pressures. I have seen sixgun cartridges loaded to over 80,000 psi that dropped cases from the pressure barrel with ease and had a completely "normal" looking primer. The firing pin/firing pin hole relationship, mainspring strength and other factors can cause primer deformation, but that is not an indicator of pressure.

Duplicating the correct overall cartridge length (OAL) with specific load data is critical. For example, many cast bullets and select jacketed bullets from Hornady, Speer and Barnes feature two crimp grooves. They are designed to be seated and crimped at either crimp groove, depending on the gun they will be fired in. However, data that was developed using the longer OAL, resulting in increased powder capacity, should never be used with the bullet seated to the shorter OAL, or pressures will soar. Bullets are not all of the same construction or diameter, and substitutions can change pressures. A classic example is Speer's .44-caliber bullets, most of which are plated rather than being of the cup-and-core construction like Nosler, Sierra and Hornady, but diameters are .429, .429, .4295 and .430 inch, respectively. All the above will have an effect on pressure, so handloads should always be assembled with exactness.

For many years it was commonly believed that cast bullets produced less pressure than jacketed bullets. There is some truth to this for certain applications and with specific bullet designs, but often the difference is minimal. One factor is that many cast bullet designs, such as the popular Keith bullets and LBT LFN styles, seat out farther than comparable weight jacketed bullets, which increases powder capacity and therefore offers lower pressures. In cartridges/loads wherein pressures don't peak until the bullet is in the bore, pressures can be less. Even here, however, bullet design, including bearing surface, gas check or plain base, seating depth, alloy, etc., will all have an effect. These variables make it impossible to offer a generalized statement comparing the pressures developed by cast bullets with jacketed bullets.

Case manufacture can also change pressures, as can variances in powder lot numbers. For example, most powder companies have a minimum/maximum lot number tolerance for a given powder's burn rate, which allows some variance. Some companies, however, hold this standard extremely tightly, while others are much more relaxed. I have seen identical powder charges and loads (primarily in magnum revolver cartridges) that varied by up to 100 fps. That "extra" velocity is not free, as pressures are also increased.

Case head expansion, primer appearance and other traditional methods for handloaders to guesstimate pressures are inaccurate, but a chronograph is a huge help in developing handloads. In short, if handloads are producing substantially greater velocities than comparable factory loads, odds are they are also of greater pressures.

With sophisticated pressure measurement methods and subsequent load data, today's handloaders can assemble ammunition that offers outstanding performance. Just be certain to duplicate loads with exactness.

Squib Loads for Battle Rifles

Mike Venturino
Photos by Yvonne Venturino

Today, a *squib* load is often referred to as one that wasn't powerful enough to push its bullet completely out of the barrel. In times gone by, it was more a word for a reduced load in a high-powered cartridge – usually for rifles. In Lyman and Belding & Mull catalogs, respectively dated 1926 and 1927, there are mentions of special "squib" or "squibb" bullets. Actually that wasn't the only name given to reduced loads. In recent reading I found them called whisper, miniature, small game, gallery and short range.

What piqued my interest in such handloads began with the project done early in 2015 for a .25-35 WCF. Winchester's 1899 catalog contained a "short range" factory load for that cartridge using an 86-grain lead alloy bullet over 5.0 grains of an unidentified smokeless propellant. I duplicated it using a bullet from RCBS mould 25-85-CM over 5.0 grains of Trail Boss. To my pleasant surprise, in a Winchester Model 1894 rifle, that combination grouped about an inch for five shots at 25 yards. Indeed, it was a perfectly usable "short range" load for small game or small varmints.

During a later conversation with a fellow shooter, he bemoaned the current shortage of .22 rimfire ammunition. That comment caused my thoughts to re-

Handloads for Varmints and Plinking

Groups of approximately one inch were perfectly suitable for short-range squib loads from this vintage Argentine Model 1909 7.65x53mm.

turn to the .25-35 WCF experience: *I wouldn't be handicapped by a .22 shortage, because I could just load up some squib handloads for my high-powered rifles.* Upon further thought, however, it occurred to me that one shouldn't assume. One should shoot and know. Of my current assortment of rifles, there are over 40 military types ranging from 6.5x50mm Japanese to 8x56mmR Hungarian. Some are scoped, some have iron sights and some carry peep sights. So if I was out of .22 rimfire ammunition but dead set on spending an afternoon

Seven vintage military cartridges were used for handloads: (1) 7.62x54mmR, (2) .30-40 Krag, (3) .30-06, (4) .303 British, (5) 7.65x53mm Argentine, (6) 7.7x58mm Japanese and (7) 8x57mm Mauser.

Squib Loads for Battle Rifles

The two failures in the project were the British .303s: No. 4 MK1 (left) and No. 5 "Jungle Carbine" (right).

thinning out the "gopher" (ground squirrel) population hereabouts, one or more of those rifles would likely be my choice for squib loads.

That left the matter of how to go about assembling squib loads for such rifles. First one must set the criteria. The loads would have to be reasonably accurate, say, capable of groups no larger than 1.5 inches at 25 yards. They also need to be safe, giving ricochets no worse than .22 rimfires. Most cast bullets meant for high-power rifles roughly duplicate the weight and length of jacketed bullets for the same caliber. Fired at a shallow angle, any bullet can bounce an amazing distance, but shorter, pistol-length bullets seem less prone to that. Also, my squib loads' bullets should not wear gas checks, which add expense and/or time in preparation. I wanted inexpensive and easy-to-load squib ammunition. In this project the inexpensive part was easy; the rest was not, at least in the beginning.

Another criterion was velocity. These loads need not be fast, because they were only going to be fired at short range. Velocities about in the range of .22 rimfires were sufficient. That part did come easily.

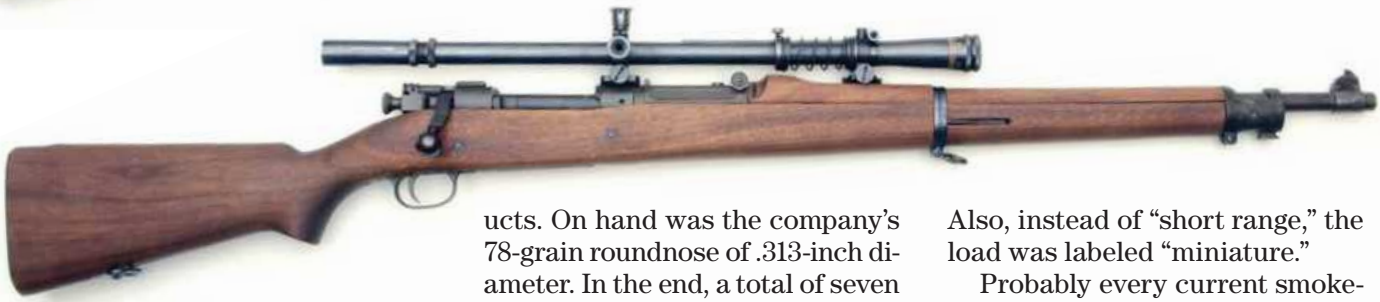
In planning, almost instantly the 6.5mms, 7mms and 8x56mmR Hungarian were ruled out due to a lack of bullet designs sans gas checks and short or light enough to be considered of pistol-bullet length. The 8x57mm Mauser was nearly ruled out until I remembered my special order RCBS mould 08-110-NAM intended for the Japanese 8mm Nambu. Poured of Linotype, this mould drops 106-grain roundnose bullets of .323-inch diameter. Also on hand was a discontinued RCBS mould 32-84-RN that drops a .311-inch roundnose weighing 81 grains as cast of straight Linotype.

That last bullet sufficed for .30-40 Krag, .30-06 and a Finnish-barreled 7.62x54mmR Model 1939, a version with which the Finns used .310-inch barrels. With Russian-made 7.62x54mmR rifles, the

Between the .30-40 Krag rifle (left) and carbine, only the former passed the 1.5-inch limit test.

Two .31-caliber rifles were tried with success: a Japanese Type 99 7.7x58mm sniper rifle (above) and an Argentine Model 1909 Mauser 7.65x53mm (below).

Both of these .30-caliber rifles shot the loads well: a Finnish Model 1939 7.62x54mm with an Accumounts 4x Soviet PE replica scope (above) and a 1903 Springfield .30-06 with an 8x Lyman Jr. Targetspot scope (below).



.311-inch diameter might be (and likely is) too small.

Next for consideration were .31-caliber rifles, such as .303 British, 7.65x53mm Argentine and 7.7x58mm Japanese. With them I would prefer at least a .314-inch bullet, but none of my extensive assortment of bullet moulds was cut for a light/short bullet (sans gas check) that large. Here I turned to Oregon Trail's products. On hand was the company's 78-grain roundnose of .313-inch diameter. In the end, a total of seven vintage military cartridges were used for squib handloads.

Powders were considered next. As said, Winchester loaded its .25-35 WCF "short range" factory load with 5.0 grains of an unidentified smokeless propellant. Winchester increased the charge incrementally to 6.0 grains for a short range .30 WCF (.30-30) and 7.5 grains for its .30 U.S. Army (.30-40 Krag). Interestingly, a charge of 5.5 grains was listed for the .303 Savage. Also, instead of "short range," the load was labeled "miniature."

Probably every current smokeless powder ranging in burning rate from Bullseye to Unique would serve for squib loads in the above-mentioned cartridges, but instead of trying them all, it seemed logical to only use a powder that was developed specifically to occupy the maximum amount of case capacity – IMR's Trail Boss. And instead of increasing charge weights by the various case capacities, I only used 5.0 grains in all seven cartridges. After all, this was merely a brief project, not a full-blown experiment to

Squib loads were tried in both of these 8x57mm Mauser rifles: a K98k 8x57mm Mauser sniper rifle with a 4x scope in short, side-rail mounts (above) and a Czechoslovakian-made G33/40 8x57mm mountain carbine (below). The K98k rifle did not shoot the loads well, but the G33/40 did.

Squib Loads for Battle Rifles

determine the "best" squib load for all rounds.

As a preview of results, my choice of Trail Boss was a good one. Despite huge case capacities with these cartridges, 5.0 grains of Trail Boss gave acceptable velocity variations. The lowest was a mere 15 fps in a couple of cartridges, with the largest being 42 fps in only one cartridge. I paid no attention whatsoever to powder position in cases and in fact ran all rounds through the rifles' magazines when possible. Nor was any sort of case filler deemed necessary.

Having on hand cartridge cases, a determined powder and charge and lightweight cast bullets of suitable diameter, one might think the rest of assembling squib loads would be a cinch, such as in measuring powder into cases and seating bullets. Trouble arrived with bullet seating. All my reloading dies for the above military cartridges have seating stems of a length to seat relatively long jacketed bullets. Only the seating dies from Lyman 8x57mm Mauser, Redding 7.65x53mm Argentine and Redding 7.62x54mm Russian sets would seat these short bullets into the cases far enough to hold them securely, but just barely.

For .30-40 Krag and .30-06, bullets were seated with a .308 Winchester die. The 7.7x58mm Japanese and .303 British bullets were seated with 7.65x54mm Argentine dies. If this sounds a bit complicated, remember that a seating die for a shorter cartridge will seat bullets reliably in a longer one *if* the case shoulder is the same diameter or smaller. The neck length of the cartridge being seated should also be longer than the cartridge neck for which the die was designed. It would be easy to get one of the reloading tool companies to cut special, longer seating stems, but things worked adequately in this manner.

During the handloading chores, it dawned on me that my .30-caliber loads were going in military rifles with famously generous chambers, so perhaps the .31-caliber (.313-inch) bullets would work well in them also. They did. All that was required was using the .31-inch size Lyman M-die for case neck expanding and a belling die prior to seating bullets; otherwise .30, .31 and .32 Lyman M-dies were used where appropriate.

At this point it would be nice to say that my efforts were a full-blown success. They were not. With the .303 British cartridge my efforts were failures. Two guns were tried: a British No. 5 "Jungle Carbine" and a No. 4 MK I rifle. Groups ran from 2.0 inches (rifle) to one huge 6.0-inch cluster (carbine). Things also started poorly with the first .30-40 Krag. The Model 1896 carbine would not group under 2.0 inches with either .311- or .313-inch bullets. A Model 1896 rifle stayed under my limit, but only with .313-inch bullets. Interestingly, with the .30-06 the bullet situation was reversed. As fired in a Springfield Armory Model 1903 fitted with a Lyman Jr. Targetspot 8x scope, .311-inch bullets shot well but .313s not as well. (That rifle is my effort to replicate closely those '03s built by the U.S. Marine Corps with 8x Unertl scopes for sniper use.)

With the 8x57mm Mauser, my first try was with a 1942-vintage K98k short, side-rail sniper rifle. Again I suffered failure. Groups were not as large as with the British .303s, but they were bigger than a self-imposed limit of 1.5

Squib Loads for Battle Rifles

caliber	rifle	barrel length (*inches*)	bullet (*grains*)	powder	charge (*grains*)	case	velocity (*fps*)	variation (*fps*)	group size (*inches*)
.30-40 Krag	US M1896	30	78 Oregon Trail RN	Trail Boss	5.0	Remington	1,214	24	sub-1.5
"	"	"	81 RCBS 32-84-RN	"	5.0	"	1,145	27	plus-1.5
.30-06	US M1903	24	78 Oregon Trail RN	"	5.0	Winchester	1,222	18	plus-1.5
"	"	"	81 RCBS 32-84-RN	"	5.0	"	1,155	15	sub-1.5
7.62x54mmR	Finn M1939	27	78 Oregon Trail RN	"	5.0	Norma	1,266	29	sub-1.5
"	"	"	81 RCBS 32-84-RN	"	5.0	"	1,230	15	sub-1.5
.303	British No. 4 MK I	25	78 Oregon Trail RN	"	5.0	Winchester	1,237	22	plus-1.5*
7.7x58mm	Japanese Type 99	25	78 Oregon Trail RN	"	5.0	Norma	1,188	23	sub-1.5
7.65x53mm	Argentine M1909	29	81 RCBS 32-84-RN	"	5.0	Prvi Partizan	1,201	22	sub-1.5
8x57mm	German G33/40	19	106 RCBS 08-110-NAM	"	5.0	Winchester	1,044	24	sub-1.5

* largest group of entire series

Notes: All chronograph readings are for five rounds taken with start screen at approximately 6 feet. All loads used Winchester Large Rifle (standard) primers. All bullets cast by Mike were lubed with SPG and poured of Linotype alloy. RCBS 32-84-RN bullets were sized .311 inch. RCBS 08-110-NAM were sized .323 inch. Oregon Trail 78 grain RN bullets were sized .313 inch.

Be Alert – Publisher cannot accept responsibility for errors in published load data.

inches. Next tried was a BRNO G33/40 mountain carbine made in Czechoslovakia in 1941. It shot squib loads nicely; all groups fired from it were under 1.5 inches.

A natural question here would be, "Why would one 8x57mm shoot those .323-inch bullets well and another not?" I believe the answer lies with the fact that all G33/40s were made by BRNO in Czechoslovakia between 1940 and 1942. That facility is famous for its excellent craftsmanship. Without a borescope to prove so, that is my supposition.

Both the 7.7x58mm Japanese and 7.65x53mm Argentine are also considered .31 calibers, the same as British .303s. Therefore, I expected poor results from the Japanese Type 99 sniper rifle and Argentine Model 1909 rifle. It didn't happen; both rifles shot .313-inch Oregon Trail bullets very well.

One cartridge that hasn't been mentioned is the 7.62x54mmR as barreled and stocked by the Finns on captured Russian actions. In an effort to replicate very expensive sniper rifles, this rifle was fitted with mounts and a replica PE

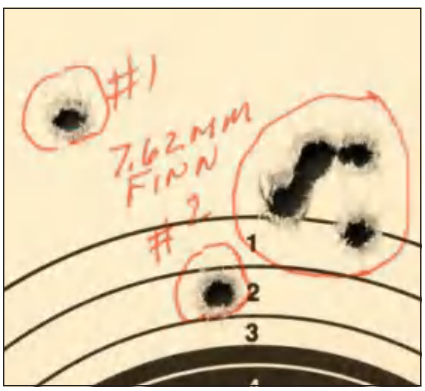
Squib Loads for Battle Rifles

These are the basic components Mike used in preparing squib loads.

scope sold by Accumounts (www.accumounts.com). It turned out to be the star of the entire project; both bullet diameters grouped into ragged holes!

However, there is one factor that needs mentioning. It is commonly stated that all jacketed bullet fouling must be removed from a barrel before cast bullets will perform adequately. That was also printed in both the 1926 Lyman manual and Belding & Mull's 1927 manual. It is also one of those things that I totally ignore in my own cast bullet shooting. Perhaps with the jacketed bullets available in the 1920s copper fouling was much worse, and perhaps if one is doing benchrest competition shooting with high-power optics, barrel fouling can be a factor.

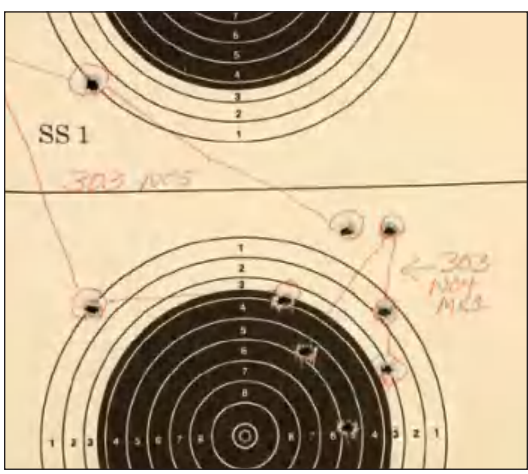
Every rifle used herein had been shot with jacketed bullets to the tune of a few dozen (G33/40) to a few hundred ('03 Springfield) without cleaning, and they still gave groups adequate for my purposes. However, the barrels had to be fouled with each bullet's specific lubricant before it began to group. This was true when switching between SPG lube on my home cast bullets and the blue, hard lube on Oregon Trail's. Always, the first two rounds were fliers, and then the rifle settled down to shoot clusters.



The best group was fired with the Finnish Model 1939 7.62x54R. Note the first two fouling shots.

All these squib loads were fed from the various rifles' magazines with two exceptions. Both Krags would not feed them at all. Those two were single shots with these short-bullet loads.

Truthfully, the .22 rimfire shortage hasn't meant much to me. The only such rifle I own at this writing is a single shot, so large quantities of .22s are not a factor. Still it's satisfying to know that on my own reloading bench with the equipment that was already on hand I could devise substitutes for .22s if need be. •



Mike attributes the poor .303 British results to a bullet too small for the wartime-produced barrels.

Reloader's Press

(Continued from page 9)

low the bullet to bump up (obturate) to fit the chamber throat, to provide a gas seal. For pistols, with closed-breech chambers, the process is a bit less critical. When the alloy is working properly in conjunction with the pressure developed by the powder charge, the precise diameter of the bullet doesn't matter all that much. That's probably why the ammunition makers relied on hollowbase, cast/swaged lead alloy bullets in factory loads for so many years, and to this day, swaged lead .358-inch, 148-grain wadcutter hollowpoints are still preferred for .38 Special target loads in S&W revolvers with .357-inch barrel groove diameters and Colts with .344- to .355-inch barrels. Hollowbase, .455-inch lead slugs are also standard in .455 Eley (aka .455 Colt) with barrels that vary from .452 to .456 inch.

Quite often, it appears, folks don't give lubricant much thought, but it is at least as important as the alloy content. It pays to choose an appropriate bullet lubricant, like Lyman Super Moly, Alox, RCBS Green, LBT Blue, Ten-X, SPG, etc., that sticks to the gun barrel and the bullet (and anything else it comes in contact with) like glue.

Of course, all the variables require some forethought, depending on what the load is designed to do. Most folks are looking for best, or good, accuracy, so high velocity might not be a big concern in the early going. Once everything is working properly, with minimal or no leading in the chamber throats and barrel, a basic load workup will reveal how much velocity can be increased before the alloy gives out. As a rule, Lyman No. 2 alloy, or any one of the similar alloy mixtures listed in the Lyman manuals over the years, is a good place to start. For starting out, some of the commercial alloys are a bit too hard, and it makes more sense to use something in the Brinell hardness number (BHN) range from 9 to 12, which quite frankly offers considerable flexibility in terms of pressure and velocity for cartridges up to magnum class. As I've attempted to remind folks over the years, Elmer Keith stuck with one in 16 (tin to lead, BHN 10) for his hot .44 Special loads and .44 Magnum loads for upwards of 65 years, and that's still good advice.

Chances are, our "drive-by" reader, who also belongs to the CBA, which is a worthwhile organization, will never see Charlie Petty's test in this issue. Too bad.

The "one size fits all" (no pun intended) e-mail brings to mind a photo of John Wayne. It was forwarded by a friend several years ago. The quote, next to the photo, is apparently attributed to John Wayne and shows up on the web from time to time: "Life is hard, it's harder if you're stupid." •

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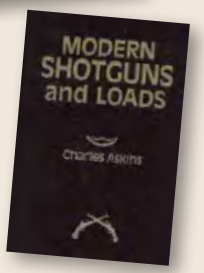

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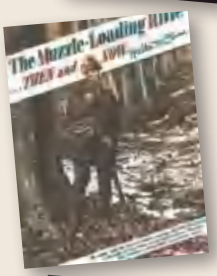

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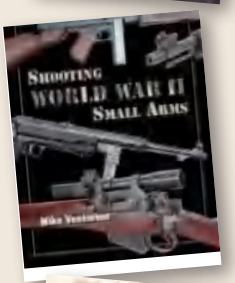

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Propellant Profiles

(Continued from page 19)

Alliant's and the bullet maker's data. With the .25-06, both lengths performed well with the nod going to the Speer length of 3.155 inches. A maximum powder charge of 51.3 grains produced a velocity right on the heels of the manual's projection. Accuracy equaled that expected from that barrel and bullet. As noted with the .243 Winchester, standard strength primers gave the most consistent results in mild weather, but were I anticipating cold hunting conditions, I'd want to know what to expect with magnum strength primers.

In the .270 Winchester, results mirrored those of the .25-06. Bullet selection is limited to 150 grains with Reloder 26, and this time, Alliant's OAL of 3.230 inches produced tighter groups. Again, barrels and throats can differ. The maximum published powder charge of 60.2 grains was tops in accuracy with standard strength primers, but I'd likely opt for the magnum strength primer were hunting temperatures to drop significantly.

In large-capacity cartridges, there is a greater range of acceptable bullet weights when paired with Reloder 26, and only magnum strength primers are employed. With the 7mm Remington Magnum, bullet weights ranged from 145 to 175 grains. I selected a favorite, Speer's 160-grain flatbase. Once again, OAL from Alliant and the bullet maker differed, 3.220 versus 3.280 inches, respectively. My rifle preferred the latter. As usual, the maximum published powder charge produced the highest velocity, smallest extreme spreads and tightest groups. Here, though, Reloder 26 seemed to shine less brightly, as the differences in projected speeds among RL-26, RL-25 and RL-23, where published, were not all that different. Although Reloder 26 velocities were always a bit higher, it took several more grains of powder to achieve them.

Last was the .300 Winchester Magnum. In this cartridge, Reloder 26 is quite versatile, finding use with bullet weights ranging from 165 to 240 grains. Given the nature of the cartridge and that it was designed to fit in a standard – or .30-06 – length action, there is no difference in OAL, all being 3.340 inches, the maximum allowable to fit in the magazine. Probably my favorite bullet weights in the cartridge are those of 165 and 180 grains, and both were used. Hornady makes a fine 165-grain, cup-and-core InterLock bullet for lighter game, and Nosler has its 180-grain Partition for the heavier stuff.

My rifle has a 23½-inch barrel, which probably accounts for the 20 fps or so loss compared to book values, but no matter. The Hornady 165 grain is a hunting bullet pure and simple. Not designed for target work, it still serves well in whatever cartridge I stuff it. As with the other cartridges, the maximum published Alliant powder charge was best, and overall results were excellent. The Nosler 180-grain Partition is also a hunting bullet, good enough to drop anything you are likely to shoot with it. It is a perfect pairing with this cartridge for heavier game. It, too, shot its best with maximum charges of Reloder 26.

While there weren't a large number of cartridges tested and certainly not enough firing of any one to test the value of the decoppering agent, my first look suggests Alliant has a winner on its hands – high velocity, consistence from shot-to-shot and lot-to-lot, easy metering and good groups on target.

In Range

(Continued from page 70)

of the top velocities were actually *lower* than in the smaller .270 Winchester.

A query to Swift elicited the reply that it was due to the company's use of a 24-inch test barrel. If that were the case, though, you would expect to find the same phenomenon with the 7mm Weatherby and the .280 Remington or with the .257 Weatherby and the .25-06 Remington. Those are exact comparisons, since the base cases are exactly the same. Instead, the figures for those come out closer to what can be found in other manuals, which is to say, the Weatherby cartridges eat up more powder, but they deliver more velocity – typically, 300 fps more for a given bullet weight.

One thing that might explain some of this is the difference in bullet types used. Although the A-Frame and Nosler Partition have a similar design, this does not mean they perform exactly the same in a given barrel. The lead core is different, the jacket material is different, the length of the bearing surface may be different.

In the late 1960s, ballistician Lloyd Brownell discovered severe pressure spikes resulting from the use of a Speer 105-grain bullet in the .244 Remington. A perfectly safe powder charge with another bullet of the same weight became positively dangerous with that one. Dr. Brownell went so far as to travel to Lewiston, Idaho, and spend some time with Speer's ballisticians, trying to figure it out. Since reading about that, I have found other references to unexplained problems with that particular bullet, from totally different (and earlier) sources.

Shortly after Barnes introduced the solid copper X-Bullet in 1989, company ballisticians found that it did not behave the same way as composite bullets of the same weight, even their own. They responded by producing a loading manual that provided separate data for use with the X-Bullet. Since then, such "mono-metal"

bullets have proliferated, as have proprietary manuals from bullet and powder companies. Specialization is everywhere, and if you ever could interchange loading data with impunity, that time is long past.

Another trend in loading manuals is to go much lighter than in former years, and also to try to apply uniform methods for all load testing. Old manuals talk about test rifles being a Mauser 98, Savage 99 or whatever, with widely varying barrel lengths. Today, the use of universal receivers and special test barrels is becoming the standard, which is all to the good.

To get back to Swift, however, at the same time as Weatherby is limiting production of its magnum rifles to 26-inch barrels, Swift is using 24-inch barrels for load development. This makes little sense in light of the fact that the vast majority of Weatherby Magnum calibers have long barrels. It does no real harm, but it misrepresents the capabilities of those excellent cartridges. However, if you have to standardize at one type and length of barrel, 24 inches is probably the one to use.

Since Swift is making extraordinary efforts to make its operation in western Kansas completely state-of-the-art, with ballistic-testing facilities the equal of any, criticism such as this looks a lot like quibbling, which is not how it's intended.

Swift's two bullet designs, the A-Frame and the Scirocco II, are premium hunting bullets in every way, intended to deliver either the best terminal performance, the best long-range accuracy or both, depending on the caliber. My own inclination is to use the bullet maker's manual when loading its bullets – or at least use the manual as the starting point. You just never know what the manufacturer might have discovered in the way of ballistic quirks with its bullets.

The example of Lloyd Brownell, the .244 Remington and the Speer 105-grain roundnose keeps springing to mind as I grow older and, yes, more fearful. •

AD INDEX

Manual Apprehension

IN RANGE by Terry Wieland

It's well known that, as people age, they become more fearful. This is nothing to be embarrassed about, and when it comes to handloading is a positive virtue. The old joke about "old and bold" applies double in handloading. It has become my invariable habit, in recent years, never to take one source of information as gospel, even such a respected volume as the *Lyman No. 49*, *Speer No. 14* or Philip Sharpe's *Complete Guide to Handloading*. Everyone makes mistakes. Ballisticians do, editors do, proofreaders do. When compiling a new load, trust nothing and no one.

That being the case, it helps to have four or five different loading manuals in order to crosscheck load data. In doing so, you come across some pretty weird stuff. For example, in the second edition of the Swift manual, which came out this year, there are loads for Swift bullets in the 8x57 cartridge that are significantly lower than elsewhere. For H-4350 (one of my all-time favorite powders and one I know well), it lists a starting load for a 200-grain A-Frame at 39.1 grains (1,819 fps) and a maximum of 42.0 grains (2,007 fps).

Loads for the 8x57 tend to be all over the map, depending on the age and fearfulness of the compilers, and the influence of the company legal team, but even so, this is remarkably light. Crosschecking to see what others have to say, I found the Hodgdon online data center's loads for a 200-grain bullet with H-4350 start – *start* – at 49.0 grains (2,276 fps) and go up to a compressed load of 54.0 grains (2,522 fps).

Surely there is some plausible explanation for this, such as a stark difference in the test rifles, but no. Hodgdon says only that it used a 24-inch barrel, while Swift used a Wiseman test barrel (24 inches) on a universal receiver. A difference in bullet construction? Not really. The Swift A-Frame is a copper and lead composite, as is the 200-grain Speer softpoint used by Hodgdon.

Obviously, a third opinion is in order but, unfortunately, neither the *Nosler No. 7* nor *Speer No. 14* manuals list H-4350 with a 200-grain bullet. Both use IMR-4350, though, and while the data is not interchangeable, it does give an indication. In both cases, their starting and maximum loads were comparable to Hodgdon's, as were the velocities listed.

Working back and comparing

their figures for IMR-4350 with the Swift manual, which also used that powder in the 8x57, Swift's figures again came up roughly 10 grains lighter and, in the case of the Nosler manual, *725 fps* slower (1,973 fps versus 2,698)! Who would I believe? I think, were I using a Nosler 200-grain Partition, I'd go with Nosler; if I were using a Swift A-Frame, I'd at least start where Swift did, and go from there.

All this is mentioned not to condemn anyone (or any manual) but to point to the wisdom of being careful and double-checking. Going the other way, in old manuals, I've found loads that were, for want of a better word, intrepid if not foolhardy, at least compared to modern figures. Sometimes this can be explained by changes in the powder, or in case capacities of modern brass versus old. Either way, it pays to be prudent.

Another odd thing in the Swift manual was its loads for the .270 Winchester versus the .270 Weatherby Magnum. For any given bullet, you would expect the .270 Weatherby to come in 200 to 300 fps faster than the Winchester; instead, although the Weatherby ate up considerably more of the same powders, for some reason some

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